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FEDERAL OUTER CONTINENTAL SHELF OIL AND GAS ACTIVITIES: A SOCIOECONOMIC REVIEW

DETAILED DATA TABLES

for

MINERALS MANAGEMENT SERVICE

(CONTRACT NO. 14-12-0001-30051)

September 30,1984

Arctic Subregion

Executive Resource Associates, Inc.

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Arctic Subregion

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(Alaskan Subregion Volumes)

1301R

September 30, 1984

Department of Interior
Minerals Management Service
Room 2526
18th and C St., N.W.
Washington, D.C. 20240

Ref. : Contract No. 3-83-1-6269: Detailed Data Tables

Attn: Mr. Kevin Banks, Interim COTR

Dear Mr. Banks:

This volume is part of a 12-volume set of Detailed Data Tables which supports the Final Report for our project entitled "Federal Outer Continental Shelf Oil and Gas Activities: A Socioeconomic Review."

As requested, we are submitting four complete sets of the Detailed Data Tables as a companion deliverable, but separate from the September 30, 1984 Final Report.

Sincerely,

Victor I. Kugajevsky, Ph.D.
Director

Victor Kugajevsky

cc : Holly Homer, Contracting Officer
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Mail Stop 635
Reston, Virgina 22091

1052R

ACKNOWLEDGEMENTS

A project as large in scope as this one is necessarily the product of many people. For direction, guidance and support on the entire project, we deeply thank our COTR Mrs. Cheryl Anderson, Economics Unit, Socioeconomic and Environmental Studies Program, MMS.

The foresight of this office has been instrumental in laying foundation for a more systematic assembly of quantitative information on the socioeconomic effects of OCS oil and gas development. This quantitative information will assist MMS in responding to Section 18 requirements in a more sound manner. Thanks also are due to Mr. Kevin Banks and Ms. Karen Gibson from the Alaska office of MMS for their assistance while acting as COTR on the project. Other MMS officials also provided valuable input during the course of the project including Mr. Paul Stang, and Mr. Peter DeWitt and the several regional specialists who provided helpful comments on our February 1984 Data Tables draft. Among the regional staff thanks are due to Karen Gibson, Alaska region; Melville Chow; John Rodi, Gulf region; Frederick White, Pacific region; and Malta Pattison; Central office.

For the contractors, ERA staff and consultants who helped to develop these tables thanks are due to Charles Bakewell, project director, Carlos Otal, Cyndy Engelhart, Thomas Jensen, and Robert Churchman and to Dr. Linda Ellana, Mr. George Sherrod and Cheryl (Chow) Taylor of Alaska; for Sterling Hobe, subcontractor, thanks are due to Mr. Ivars Gutmanis, Tom Meakum, Richard Tinney and Sarah Swisher.

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Ms. Mary Robey, U.S. Department of Transportation, United States Coast Guard, in the area of oil spills;

Professor Timothy J. Tyrrell, Department of Resource Economics, University of Rhode Island, in the area of tourism and recreation;

Mr. John Palmisano, Regulatory Reform Staff, Environmental Protection Agency, in the area of air and water pollution;

Commissioner Don Collinsworth, State of Alaska Fish and Game Department for Alaska for subsistence information;

Steve Behnke, State of Alaska Fish and Game Department Subsistence Division, for subsistence data;

Dr. Edwin Clark III, The Conservation Foundation, in the area of water pollution;

Ms. Peggy Herring, Clean Seas, Inc. , in the area of oil spill analysis;

Mr. Blair Bower, Resources for the Future, Inc., in the area of tourism and recreation;

Mr. Stephen P. Chamberlain, American Petroleum Institute, in the area of oil spill analysis and supplies and services:

Ms. Carol Pillsbury, California Coastal Commission, in the area of recreation and tourism;

Dr. Everard M. Lofting, Engineering Economics Associates, Inc., in the area of recreation and tourism;

Dr. Peter Calkins, Environmental Protection Agency, in the area of air and water pollution;

Dr. Joel Smith, Environmental Protection Agency, in the area of air and water pollution;

Dr. David Foster, Environment Protection Agency, in the area of air and water pollution and oil spills:

Mr. Daniel Basta, NOAA, in the area of commercial fisheries;

Mr. John Cohrssen, Council on The Environmental Quality, in the area of oil spills; and

Mr. Bud Wagge, SEACOG, in the area of oil spill cleanup costs.

The above individuals provided invaluable help to the project in identifying appropriate data, interpreting it and otherwise supporting the completion of this effort.

The contractor is, of course, responsible for any errors or omissions in this work.

TAB I

I. Background and Introduction

I. Background and Introduction

This introductory section presents a brief background discussion to this project, describes the programmatic need which the project addresses, and provides the reader with relevant background on the scope, purpose, uses, and limitations of the data tables presented in these four volumes.

A. Background

This project was sponsored by the Economics Unit of the Social and Economic Studies Program (SESP) of the Minerals Management Service (MMS).

The need for this project grew out of the mandate imposed on Interior under Section 18 of the Outer Continental Shelf Lands Act of 1969.

Section 18 requires the Secretary of Interior to consider a variety of factors in making leasing determinations to ensure equitable sharing of developmental benefits and environmental risks between OCS regions. Section 18 also requires the Secretary to consider the, timing and location of leasing so as to obtain, to the maximum extent possible, an appropriate balance between the potential for the discovery of oil and gas and the potential for adverse impact on the coastal zone. A 1981 D.C. Court of Appeals ruling clarified that this consideration be a quantitative evaluation of the social and environmental risks and benefits for each OCS planning area.

This project is designed to provide a basis for responding to this requirement for using quantitative data for delineating socioeconomic effects of OCS oil and gas development.

In previous leasing programs, MMS sought to support the leasing plans with quantitative analysis on the potential environmental and socioeconomic effects of the leasing plan. However, this analysis has been handicapped by the absence of comprehensive, systematic, accessible, quantitative data on such effects.

1. General Purpose

This present project is designed to begin filling the quantitative data void. As such the project is a benchmark effort, to establish an information base of quantitative data or socioeconomic baseline and effects data of OCS oil and gas development.

This preliminary information base is intended to be:

- o supportive of the Fall 1984 Leasing Program and the quantitative analysis of socioeconomic effects required for the program;

o a benchmark data base which:

- can be incrementally expanded as *more* data becomes available from SESP studies program;

- provides comparable data across (ICS regions;

- emphasizes quantitative data on baseline conditions and effects;

- is available in a readily accessible and timely fashion to support Section 18 analysis;

- is **enhanceable** as better methodologies for identifying **OCS** activity effects in quantified form are developed in the SESP studies program.

In summary, this project represents the initial effort to meet a present and ongoing need for better quantitative information on socioeconomic effects of **OCS** oil and gas development leasing. As such, it represents the foresight of the Economics Unit of SESP to build a more coherent focus and systematic structure into the rich, multiple source studies program of SESP and to ensure that this program is maximally responsive to the mandate of Section 18 and the 1981 **D.C.** Court of Appeals ruling to maximize quantitative evaluation of socioeconomic effects in **OCS** leasing decisions.

2. Limitations

The development of the information base envisioned by this effort is a complex, multi-year effort. This project presents only a preliminary start and foundation for the final, desired product. The scope of this project is further constrained by the following limitations:

o the project was limited to existing available literature which presents quantifiable information on baseline or ef **fects.***/

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* **MMS** and other organizations such as state agencies have sponsored numerous studies *of* **OCS** development impacts. *However,* our *review* of most of these indicates that very few of these studies have developed systematic, comparable and planning area wide quantitative effects data. This limitation applies especially for the Alaska region studies where much work has been done on a local village level emphasizing cultural anthropological issues.

- o the project was limited in time and resources;
- o the project effort confirmed the paucity of quantified effects data but sought to mitigate this by limited extrapolation (this is explained more further on) .

3* Value of Project Results

Despite the above caveats and qualifiers, the data and baseline and effects tables developed through this project are of substantial value. This assembly of baseline and effects data represents the first comprehensive array of documented information on OCS oil and gas development impacts on socioeconomic resources for the entire Us. coastal zones and offshore areas. As such it provides an invaluable resource for:

- o fulfillment of the Section 18 mandate to assess and weigh such impacts in the Five Year Leasing Programs;
- o comparison of effects between and among OCS planning areas;
- o further analysis and study which expands the base of knowledge, on hydrocarbon resource development and its effects on socioeconomic systems, and the associated communities and people that live in them;
- o delineating the scope and contents of a more coordinated, uniform and incrementally augmented quantitative data collection and research program on the quantitative effects of OCS oil and gas development.

With this background, the next section presents a brief overview of the project and the deliverable presented in this document.

B. Project Overview

In this project, ERA was called on to deliver the following products:

- o annotated bibliography draft
- o Draft Data Tables
- o Draft Report
- o Final Report

This document contains the Draft Data Tables as revised for final submission with the Final Report.

This set of data tables responds to the following SOW objectives, viz:

1. Prepare a series of tables containing relevant quantifiable socioeconomic baseline information for each planning area:

2. Prepare a description of potential OCS oil and gas activity impacts on the socioeconomic environment, with accompanying tables, for each planning area;

3. Where possible, translate the impact to dollar using market and non-market valuations as appropriate.

1. Approach

The detailed data tables were developed by utilizing current literature and gathering existing (emphasis added] quantifiable socioeconomic information that identifies OCS related socioeconomic impacts, summarized by planning area. As required by the SOW, no new analysis of OCS activity impacts was performed.

Our charge was to identify, select, and convert existing quantifiable data to document baseline (defined as most current historical period data) and impacts (defined as documented effects of OCS activity) of OCS oil and gas development on the socioeconomic environment in each planning area and to assemble these data in a format that allows for comparison between planning areas. This has been done.

Because of the upcoming fall of 1984 Five Year Leasing Program announcement, MMS interest has focused mainly on effects data. MMS required that these effects be expressed on a "per barrel of oil equivalent (BOE)" basis and aggregated to as few summary values as possible. The BOE approach permits the multiplication of the resulting ratio's by reserve additions for future lease sales to obtain effects projections. This flexible approach provides the user with an effects database which can be more readily adapted to future lease programs and changing estimates of reserves added by those programs.

Hence, this detailed data volume (one of 12 detailed volumes) presents baseline data and detailed effects data for one of the lower-48 OCS planning areas or one of the three Alaskan sub-regions.

2. Scope

The SOW designated the following study sectors for which baseline and effects (impact) data were to be assembled:

- Oil Spill Cleanup Costs;
- Commercial Fishing Industry;

- o Recreation, Tourism and Aesthetics:
- o Subsistence Activities;
- o Economic and Demographic and Impacts;
- o Air and Water Quality.

Some months into the project, this study sector list was modified and expanded to include:

- o Oil and Gas Development Supplies and Services;
- o Commercial Fishing and other Water Based Extraction Activity (Kelp, Minerals);
- o Transport and Transport Related Resources;
- o Military Operations:
- o Infrastructure Resources (Housing, Schools , Public Finance).

Another change occured in the number of planning areas. Originally, the study was scoped to develop baseline and effects tables for four OCS regions and 18 OCS planning areas. Subsequently, MMS expanded this to 21 planning areas. MMS identified still more planning areas for potential inclusion in the project in June. They were the Florida Straits, Aleutian Basin, Bowers Basin and Aleutian Arc. They were identified too late for specific inclusion in the project, but may be considered by readers through analogy and extrapolation of effects for the 21 planning areas presented in the study.

The data tables reflect these several modifications. The two figures on the following pages depict the planning areas that were used to assemble data presented in this document.

3. Data Sources

The array of data tables presented in this document has been assembled from a variety of secondary data sources including:

- o U.S. Library of Congress;
- o National Technical Information Service (NTIS):
- o Department of Interior Library in Washington? D.C.:
- o MMS Library in Anchorage, Alaska;

- o American petroleum Institute Library (D.C.);
- o Department of Energy Library (D.C.);
- O Department of Interior Regional Offices;
- o Office of Coastal Zone Management Reference Library at NOAA;
- o Mail Survey of State Travel Departments;
- o Mail Survey of Public Information Officers on U.S. military bases;
- o Review of Periodicals such as:
  - Fossil Energy Update
  - Offshore Magazine
  - Oil and Gas Journal
  - Lists of technical reports and projects
- o Coastal Zone documents:
- o State Leasing studies;
- o U.S. Census data;
- o Other specialized sources.

In particular, we were directed to consider recent Environmental Impact Statements (EIS) for each planning area. Those important documents incorporate up-to-date, wide-ranging but detailed effects data linked to specific changes in resource size.

The data source for each data set is identified in the data tables.

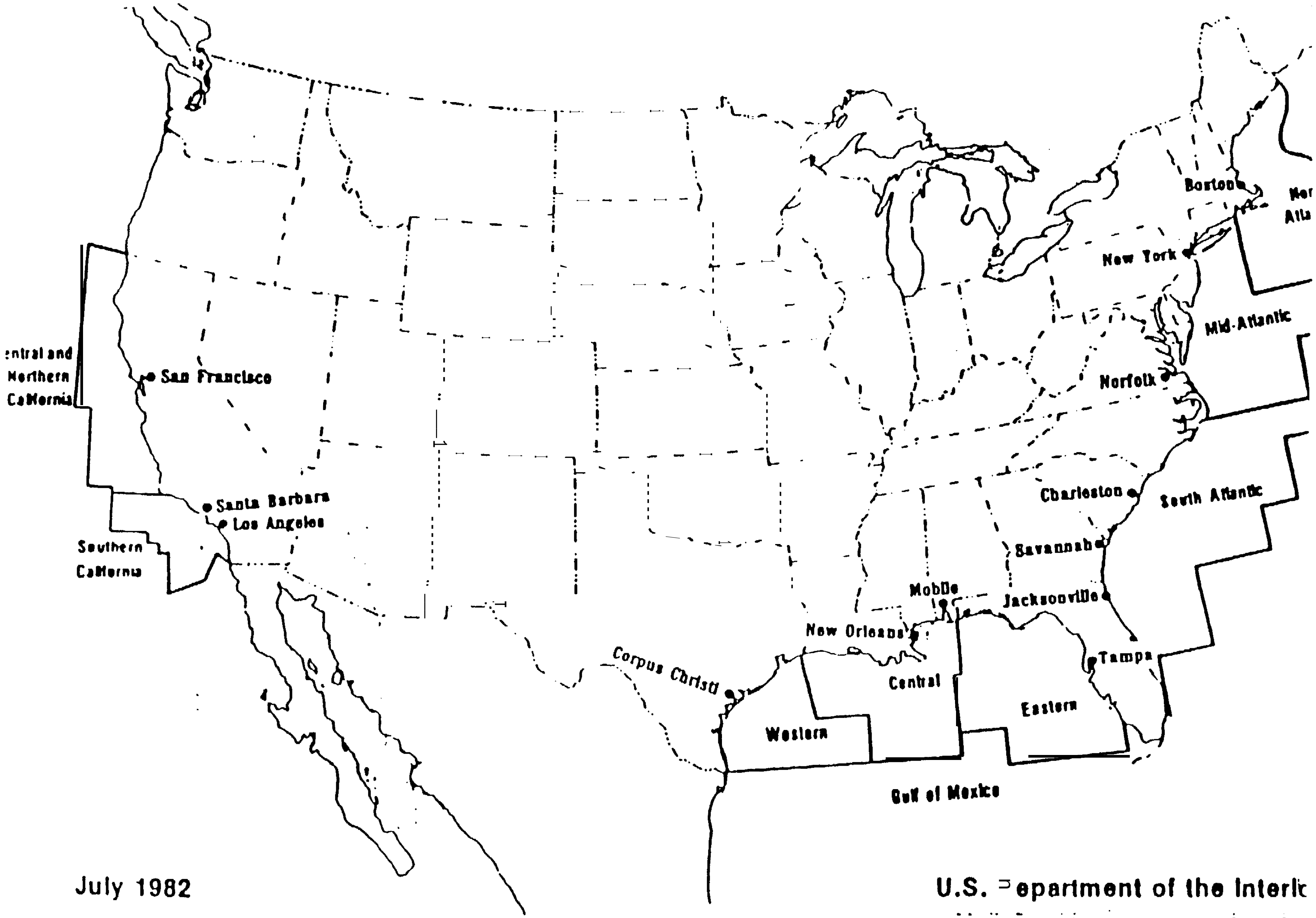
4. Methodological Note

The reader should be aware of several methodological aspects of these data tables.

The total MMS OCS planning areas that were the subject of this effort encompass approximately 350 onshore counties (including parishes in Louisiana and boroughs in Alaska).

The data tables presented herein have been assembled from secondary data sources. In many instances, data were assembled at the county level because this is the unit for which much data is available. After assembly at the county level, data were then aggregated up to the appropriate OCS MMS planning area. (The detailed county level tables are not submitted in this report but can be provided to MMS if necessary. However, in order to keep the data collection effort manageable, much of the county data was consolidated on worksheets and is not available in tabular form.)

OUTER CONTINENTAL SHELF PLANNING AREAS



July 1982

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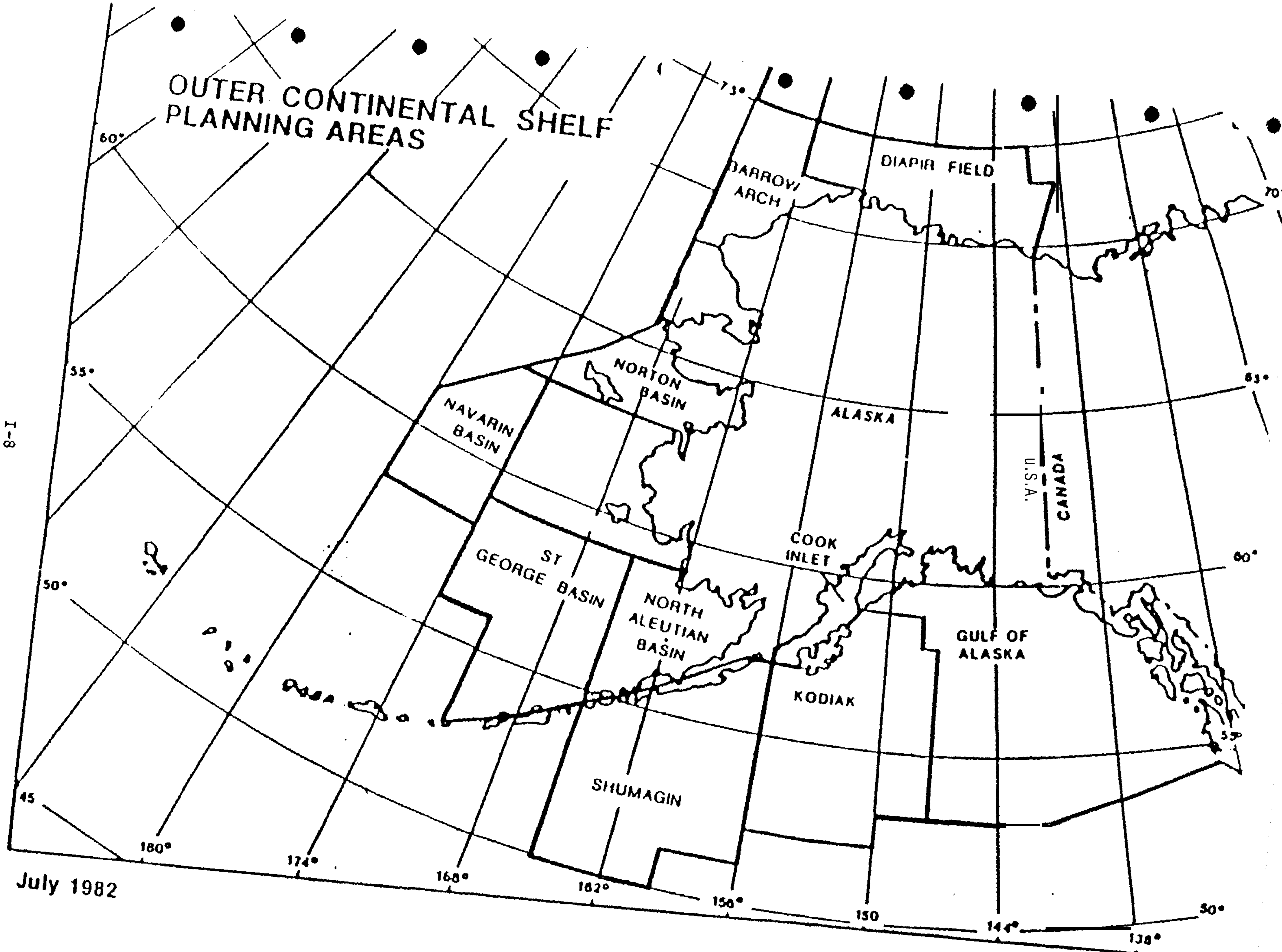
OUTER CONTINENTAL SHELF PLANNING AREAS



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For this study, each planning area was defined to include the offshore waters and coastal zone counties that fall within established OCS MMS planning area boundaries. The narrative accompanying each planning area presentation delineates the specific boundaries of the planning area under discussion and presents a map of the area. This provides the reader a visual understanding of the area's boundaries. In some instances counties have been assigned wholly to one or another planning area even though a geographic portion of the county falls into another planning area. The county level was used as the fundamental data unit. However, division of the data for each of a few counties to permit their precise allocation to respective planning areas would be neither meaningful nor cost-effective and would have required primary analysis. Thus shared counties were assigned to the one planning area which dominated each.

Brief narratives are provided for each tables set to highlight the principal trends, patterns and characterisitcs which describe baseline socioeconomic resource conditions in that area. Effects tables also are accompanied by brief narratives that describe how OCS oil and gas development is likely to impact socioeconomic resources in the planning area.

The reader is forewarned that secondary data showing quantitative impacts (or effects) of OCS oil and gas development acitivity on coastal zones is:

- o very spotty;
- o limited;
- o in non-uniform measures across planning areas;
- o not available at all in many study sectors for many OCS planning areas.

Our client. MMS Environmental Studies Program was aware of these limitations. "To partially overcome these limitations, we were directed to extrapolate effects data from one planning area to another, wherever it was feasible and sensible to do so. This has been done to the extent possible given data constraints and limitation of project time and funds. However, due to project resource constraints, we have been unable to buttress these extrapolations with the type of analysis of planning area characteristics that might and ought to be used to adjust, modify, and possibly qualify an effects factor taken from one planning area and moved into another.

It is also worthwhile to note that many significant OCS activity effects do not register in quantitative and statistical data. Instances of this include certain political system, and economic effects, and a broad range of social, cultural and community effects.

This is particularly true for the "frontier" regions such as Alaska. For example, impacts on native cultures are often documented in numerous reports but in a descriptive, narrative manner. Moreover, available statistical data reflects only a small segment of the totality of impacts. Hence, impacts assessed only from quantitative data will "understate" the range and pervasiness of OCS activity effects. Yet, significant effects occur as for example in such critical sectors as the political infrastructure, with the make up of local political bodies changing rapidly as a result of the influx of new groups into Alaska. These groups have interests that clash strongly with those of previously established communities and their value systems. "Developers", environmentalists and native culture preservationists are often poles apart on issues which are caused by and exacerbated by OCS activity and its effects. Special studies of political system changes and its multiple effects document this very significant impact; however, very little or no quantified data exists that describes these phenomena. In regions such as Alaska, these types of effects are at the center of broad cultural, economic and social change brought about by OCS activity.

Hence, any 'information" base that is designed to be a repository of information on OCS activity effects on coastal zones should include this type of qualitative information.

A principal focus of MMS interest is in the effects that OCS oil and gas development has or may have on coastal zone socioeconomic resources. It was decided that these effects data would be quantified and converted to monetary or dollar effects per barrel of oil (BOE) produced or estimated as available resource.

This conversion to a common measure of dollar effect per BOE provided:

- uniform measure of effects
- ability to compare effects between OCS planning areas
- ability to scale effects data to future MMS estimates of resource sizes

OCS development effects data were sought in the literature with limited extrapolation, interpretation and judgment. In order to be usable, the effects were expressed as a dollar impact per barrel of oil. Environmental Impact Statements and their supporting documents were a major source of the necessary effects data. If the effect was expressed in units other than dollars, an appropriate dollar price or cost was identified and multiplied by the absolute unit change. Then the resulting absolute dollar effect was divided by the related barrels of oil equivalent. The related oil volume was either production, recoverable reserve additions, or spilled material over varying time spans.

The effects data are presented in the data tables. The tables contain the absolute dollar effect and dollar effect expressed per barrel of oil equivalent (BOE).

The process by which effects were related to barrel of oil equivalent was as follows. Once the dollar effect was identified, we related this to resource production. Some of the effects data is not variable with production. Here we related costs over the project life to cumulative recoverable reserves (cumulative production). This provided an average increment per barrel of oil over the life of the project and resource. If on the other hand the specific effects in a given year were related to production in that same year, the effects/barrel would be infinite in the beginning, dropping rapidly in the middle years as exploration and development efforts end. The effects per barrel would rise toward the end of the project, given relatively level operating costs for production.

In order to relate effects to natural gas production, we converted gas to its barrel of oil equivalent. This was accomplished by relating the thermal energy content of gas to oil without considering relative efficiencies during use. Since natural gas contains 1030 BTU per cubic foot and a barrel of oil contains 5.8 million BTU, division of the latter value by the BTU content of natural gas determines the cubic feet (5,631) of gas required to provide the BTUS of a barrel of oil.

Then, the combined effects for oil and gas development per barrel of oil equivalent were calculated as:

$$\text{Dollar Effect per barrel of oil equivalent} = \frac{\text{Absolute Dollar Value of OCS Change Effect}}{\text{Combined production of oil (barrels) and natural gas (cubic feet/5631 cf/barrel)}}$$

Each table with effects data, therefore, displays both the absolute dollar value of OCS development and (actual or potential) dollar effect per BOE.

' *

Within each planning area document the order of presentation for effects and baseline data tables is as follows:

1. Supplies and Services
2. Oil Spill and Cleanup Costs
3. Commercial Fishing
4. Transportation
5. Subsistence
6. Tourism and Recreation
7. Socioeconomic Infrastructure
8. Military
9. Air and Water Quality

Another point on the order of presentation is that for each planning area, effects tables are presented first, followed by baseline data tables. This was done for two reasons: (1) MMS preferred emphasis on the effects data and (2) desire to extract these effects tables into an executive summary for easier use in Five Year Plan analysis efforts.

8. Specific Methodologies

In the course of the project, several methodologies were developed for determination of effects value. Usually the methodologies involved the translation of non-monetary effects desired by MMS. Those conversions of data required fairly straight-forward methodologies. A much more complicated methodology was required to extrapolate exploration and development expenditure data from the Gulf of Mexico to all other planning areas. The resulting methodologies are in the following pages and are identified by the effects item name.

1. Supplies and Services:

Extrapolation of Oil and Gas Exploration
and Development Expenditures outside
the Gulf of Mexico.

Oil and gas exploration and development expenditures are a major indicator of OCS socioeconomic effects. Yet comparable expenditure data was found for only 5 *of* the 21 OCS planning areas studied. A methodology was developed to permit extrapolation for the remaining 16 planning areas.

The level of exploration and development expenditures varies with the anticipated resource size and the estimated per-unit cost of recovering the resource. The per-unit recovery costs vary according to depth, environment and conditions, technology, and resource type. If we are able to: 1) identify the recovery cost of a barrel of oil equivalent in one area, 2) develop an index of per-unit recovery costs across different OCS areas, and 3) identify approximate economies of scale for alternative resource sizes, then we should be able to apply those data to a resource size for any area and extrapolate its recovery cost, if that cost cannot be found in secondary sources.

Some secondary exploration and development cost data for oil and gas activity were found in the Final Environmental Impact Statement published by Minerals Management Service (MMS) in January 1983 for the Gulf of Mexico. However, comparable data were not available for all other planning areas and regions. Thus, an extrapolation method was needed. Total estimated exploration and development expenditures divided by the resource size in barrels of oil equivalent for the Gulf of Mexico does produce a factor that could be used as a benchmark multiplier to estimate the recovery cost of other (3CS oil and gas resources. Therefore, a method for extrapolating the Gulf of Mexico expenditure data per barrel of oil equivalent (BOE) was developed and is described below.

Basic Methodology

The Metairie office of Minerals Management Service prepared an environmental impact statement (EIS) for OCS Lease Sales 72, 74, and 79 in the Gulf of Mexico. In conjunction with that EIS, estimates of exploration and development costs were developed for the Central, Western and Eastern Planning Areas of the Gulf, consistent with respective anticipated resource characteristics. Those estimated resource characteristics included oil and gas resource depth, drilling and completion technology, production methods, environment and conditions, and were the basis for respective engineering designs. The composite engineering design, tailored to the recovery of a particular resource, determined the estimated capital and operating costs for the exploration and development of the anticipated resource.

The direct exploration and development costs estimated by MMS for the Gulf of Mexico in the January 1983 Final EIS are summarized by planning area in Table 1 below.

TABLE 1

DIRECT COSTS OF RESERVES ADDED

Planning Area	Direct Costs	Reserves Added (BOE)	Cost/BOE
Eastern Gulf	$1.3 billion	150.9 million	$ 8.61
Central Gulf	5.0 billion	283.1 million	17.66
Western Gulf	1.8 billion	122.2 million	14.73

The data are for MMS conditional mean resource scenarios, and the costs are in 1983 dollars. The table indicates direct costs for exploration and development of 283.1 million barrels of oil equivalent in the Central Gulf of Mexico Planning area. These direct costs include investment and operating costs for exploratory and development drilling as well as investment costs for offshore development structures (i.e., platforms and OCS gathering and transmission pipeline). The Central Gulf expenditure was converted to cost per-barrel of oil equivalent by dividing the $5.0 billion total outlay by 283.1 million barrels of oil equivalent. The resulting estimated cost of recovering the average barrel of oil equivalent for the lease sale in the Central Planning Area is $17.66.

Comparable cost data for the other MMS planning areas and Alaskan regions generally were not found in the secondary data search. In the absence of that data, a method for extrapolation of the Gulf data was sought. Availability of three alternative composite benchmark costs, one for each Gulf of Mexico planning area, complicates but enriches the extrapolation process. The extrapolation process benefits from having three potential benchmarks, each reflecting its own resource mix (oil versus gas) and characteristics as well as different stages of industry maturity. For example, the Western Planning Area has been drilled and produced for years and yields substantial quantities of gas. The Central Area is a mature producer of both oil and gas. The Eastern Planning Area has yet to produce oil or gas and, thus, is very immature by comparison.

While the availability of three estimates may facilitate cost sensitivity analysis, it also necessitates selection of a primary benchmark cost. We have chosen to use the Central Planning Area cost/BOE as our base because of the area's OCS maturity? stability, and well-published engineering, investment and operating information. Thus, our benchmark cost for exploring and developing one barrel of oil equivalent is the Central Gulf value of $17.66.

Three sets of data still are needed to convert the direct exploration and development cost benchmark to cost estimates for other regions. The $17.66 cost per barrel of oil equivalent must be adjusted for differences in resource size, composition, well depth and productivity, water depth, weather conditions, distance from shore, technology, and transportation plan. First, the adjustment for resource size requires mean estimates of additions to recoverable oil and gas reserves for each planning area. MMS estimates of increases in recoverable reserves associated with contemporary lease sales are shown in Table 2. Gas is converted to millions of barrels of oil equivalent. This is accomplished by relating the thermal energy content of gas to oil. Since natural gas contains 1030 BTUS per cubic foot and a barrel of oil contains 5.8 million BTUS, division of the latter value by the BTU content of natural gas determines the cubic feet (5,631) of gas required to provide the BTU's of a barrel of oil. The barrels of oil equivalent for oil and gas reserves are added to arrive at increased recoverable reserves for each OCS planning area. Multiplication of those increased recoverable reserves data by the $17.66/BOE benchmark cost indexed and scaled for the area or region under consideration will generate an estimate of total direct exploration and development costs for the resource and region.

The second set of data that is needed is a composite index of the relative cost of exploration and development of a given amount of additional oil and gas reserves in each planning area or region. Such an index would weight the respective oil and gas exploration and development cost indices by the estimated relative composition of reserves (oil versus gas) in each planning area. The cost data used must reflect similar engineering design considerations using consistent assumptions in order to provide useful comparative information. That information, if expressed as a ratio to the Central Gulf data (Central Gulf value = 1.00), can be applied to the benchmark cost.

The final group of data required would be the economies of scale and cost reductions which may be achieved as oil and gas resource volume increases. These data for relevant resource sizes would be weighted in terms of the projected composition of recoverable reserves (oil versus gas) and multiplied by the product of the Central Gulf expenditure figure and the composite oil and gas index. (Technically the weighting of both the ‘second and the final data sets should be cost-based, but a volume-based approach is quicker and sufficient) .

TABLE 2

INCREASED RECOVERABLE RESERVES

BY OCS PLANNING AREA

(Millions of BOE's)

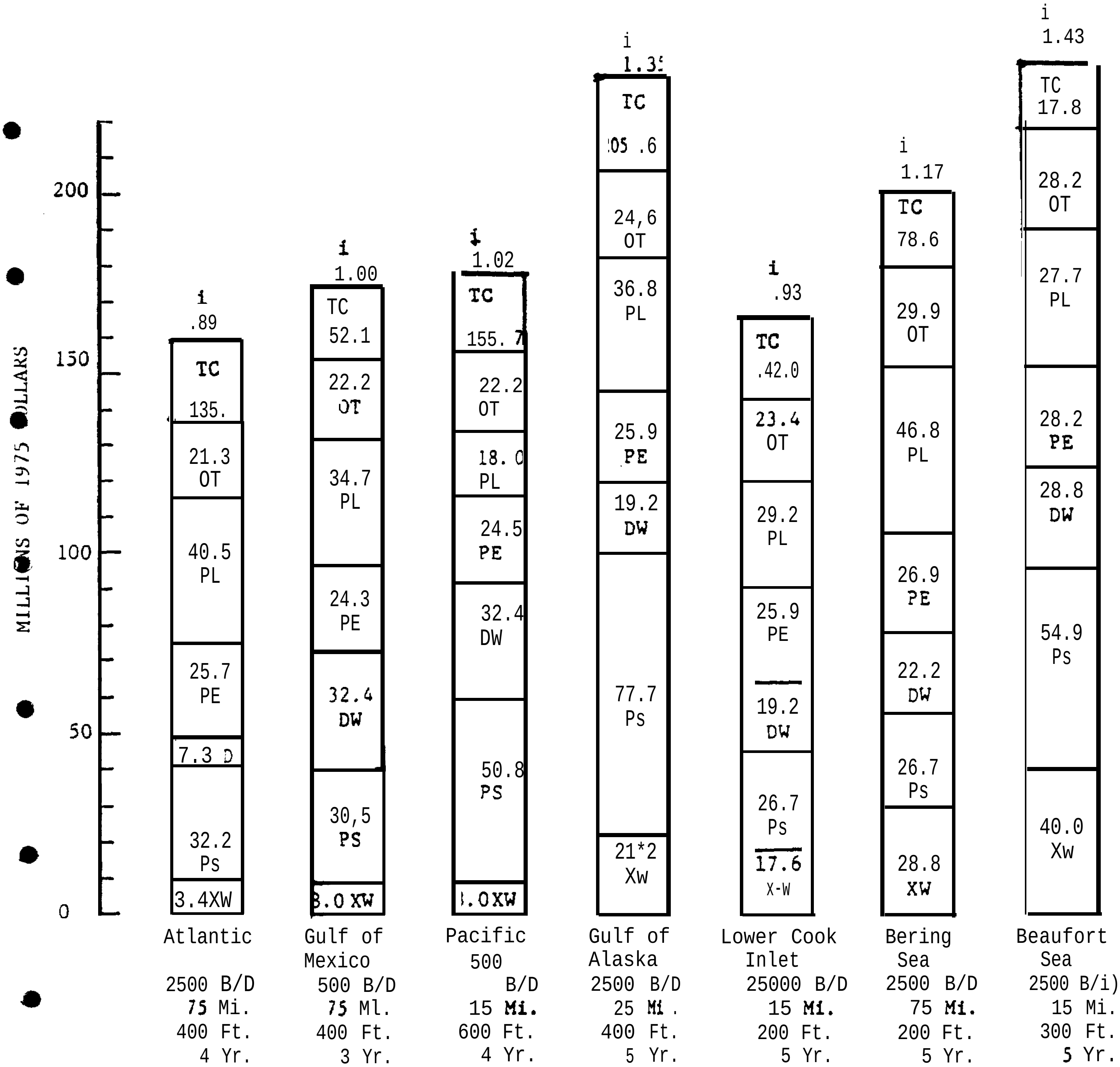
OCS Planning Area	Oil	Gas	Gas Condensate	Increased Recoverable Reserves
Central Gulf of Mexico	97	186.1		283.1
Western Gulf of Mexico	29	93.2		122.2
Eastern Gulf of Mexico	123	27.9		150.9
Southern California	270	881.9		1151.9
Central/Northern California	291	50.6		341.6
North Atlantic	210	870		1080
Mid Atlantic	879	655		1534
South Atlantic	850	3019		3869
Gulf of Alaska/Cook Inlet	680	596		1276
Kodiak		950.3	151.7	1102
Norton Basin	480	356		836
Navarin Basin	1200	1363		2563
St. George Basin	600			600
Diapir Field	3000			3000

Sources: Minerals Management Service and Executive Resource Associates estimates

An Arthur D. Little study in 1975 entitled "Outer Continental Shelf Oil and Gas Costs and Production Volume: Their Impact on the Nation's Energy Balance to 1990" provided the relative cost data needed to develop both the composite oil and gas index across planning areas and a factor which accounts for the economies of scale. The cost data are somewhat dated, but if we assume that technological advances since 1975 have been proportional in all OCS regions and that similar economies of scale still exist, then the data still may be used to establish the relativity of regional costs. Fortunately, the study provides estimates for all the regions of interest to us -- the Atlantic, Gulf of Mexico, Pacific, Gulf of Alaska, Lower Cook Inlet, Bering Sea, and Beaufort Sea.

Figures 1 and 2 present the Arthur D. Little direct costs and our relative cost indices for exploring and developing equal quantities of oil and gas reserves in OCS planning areas and Alaskan subregions, respectively. The costs, in millions of 1975 dollars, include exploration wells, platform substructure, appraisal and development wells, platform equipment, and gathering and transmission pipelines. For oil development, offshore tankfarms are also included. In addition, the Arthur D. Little costs and related cost indices account for other factors which affect cost such as daily production rate, distance from shore, water depth, and exploration and development life.

Analysis of Figures 1 and 2 clearly shows that the relative exploration and development costs for a given resource size increase as activity takes place in more remote and hostile areas with difficult development conditions. The cost of exploration wells are estimated to to range from 5% to 7% of total cost in the areas off the Atlantic and Pacific Coasts and in the Gulf of Mexico, while their relative costs are estimated to range from 10% to 20% in the offshore areas of Alaska. Stated in another way, not only are the per-unit costs higher in remote and hostile areas, but the share of total capital required for exploration which has to be risked is also higher.

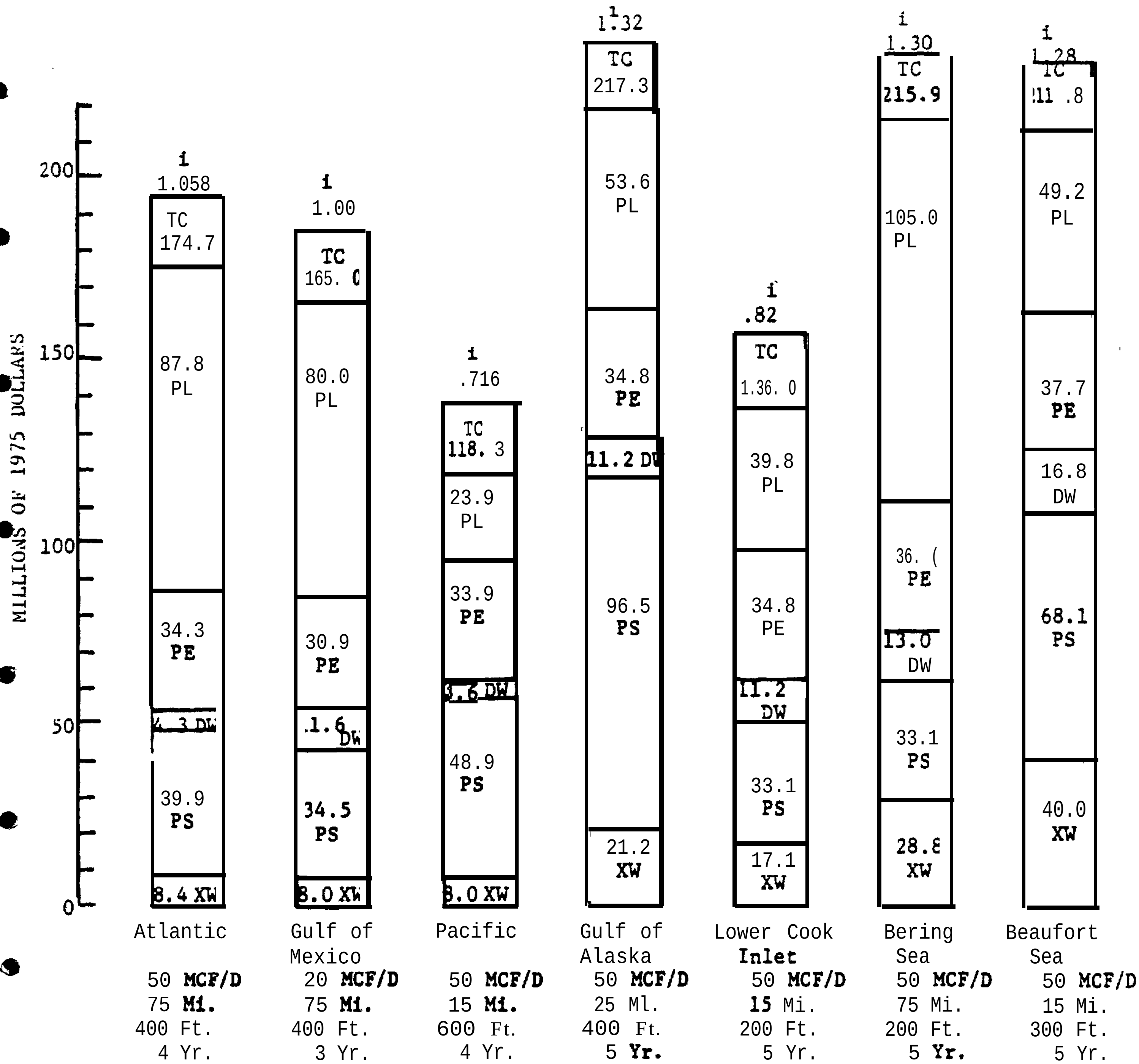


OT = Offshore Tankfarm
PL = Gathering Lines and Pipeline co Shore
?E = Platform Equipment

DW . Appraisal and Development Wells
PS . Platform Substructure
XW . Exploration Wells
TC = Total cOst
i = Index of Gulf of Mexico

FIGURE 1 : Exploration Drilling Costs and Field Development Costs and Indexes for a "Typical" Field with 150 Million Bbl Recoverable Reserves - Oil

Source: Arthur D. Little, Inc., estimates.



PL = Gathering Lines and Pipeline to Shore
PE = Platform Equipment
DW = Development and Appraisal Wells
PS = Platform Substructure
XW = Exploration Wells
TC = Total Cost
i = Index of Gulf of Mexico

FIGURE 2 : Exploration Drilling Costs and Field Development Costs for a "Typical" Field with 2500 billion cublic feet Recoverable Reserves - Gas

Source: Arthur D. Little, Inc., estimates

Platform costs are extremely sensitive to water depth. For instance, platform costs as a percentage of total investment in the relatively shallow Bering Sea are lower than platform costs in the deep water of the Gulf of Alaska. Alternatively, OCS pipeline costs are higher for the Bering Sea fields as compared to fields in the Gulf of Alaska, because of their greater distance from shore

Development drilling costs ranged from 5% to 20% of total cost. These costs are very responsive to average well productivity. For instance, if oil is found off the Atlantic Coast in commercial quantities productivity will most likely be higher because of the Atlantic's new and promising potential as a production area. On the other hand, well productivity is expected to be lower in the Gulf of Mexico where many of the most productive fields have been developed and now operators often use enhanced oil recovery methods to extract oil from marginal fields. These contrasting well productivity conditions explain why as a portion of total costs development drilling costs are expected to be only 5.4% off the Atlantic Coast as opposed to 21.3% in the Gulf of Mexico.

Production equipment costs range from 12% to 20% of total costs in the case of oil and from 15% to 30% of total costs in the case of gas. In contrast to the other cost components, production equipment costs are less sensitive to conditions such as water depth, distance from shore, and geographical location.

Table 3 presents planning area composites of the oil and gas indices of interreginal cost with the Gulf of Mexico as a base (index = 1.00). This composite index weights the relative oil and gas exploration and development costs in terms of the projected composition of recoverable hydrocarbon reserves in each planning area. For example, the composite cost index for exploration and development of South Atlantic resources is greater than 1.00 because it is heavily weighted towards gas (78.1% of the area's total BOE's) which entails costly pipelining. Alternatively, the cost index is weighted towards oil in the Central/Northern California area and evenly weighted in the Navarin Basin. An example of the method used to derive this composite index is shown in the next section.

TABLE 3

COMPOSITE OIL AND GAS COST

INDEX BY **OCS** PLANNING AREA

(assumes equal resource **size**)

OCS Planning Area	Composite Index
Central Gulf of Mexico	1.00
Southern California	.786
Central/Northern California	.974
North Atlantic	1.027
Mid Atlantic	.962
South Atlantic	1.021
Gulf of Alaska/Cook Inlet	1.105
Kodiak	.82
Norton Basin	1.225
Navarin Basin	1.24
St. George Basin	1.17
Diapir Field	1.43

Note: The composite oil and gas indices for each planning area were derived by substituting real values into the following equation: $(i_1(a) + i_2(b))$. See text for further explanation.

Sources: Arthur D. Little, Inc., Minerals Management Service, and Executive Resource Associates

Table 4 presents data on the economies of scale which may be expected in each planning area for the oil and gas resource volumes in Table 2, depending upon where those volumes fall between 150 and 2000 million barrels of oil and between one and ten trillion cubic feet of natural gas, respectively. The per-unit costs of exploring and developing 150 mmbbls of oil and one tcf of gas each represent a base factor of 1.00, whereas the per-unit costs for the larger resource sizes are expressed by factors of less than 1.00. Throughout the planning areas it is evident that greater economies of scale may be realized as gas volume increases relative to oil volume. Therefore, if the gas resource estimate in the South Atlantic is 78.1% of the area's sizable resource estimate, then very beneficial economies of scale may be attained by exploring and developing the hydrocarbon resources in this area.

Application of Methodology

Calculations required to extrapolate per barrel of oil equivalent and total exploration and development costs are illustrated below for the Southern California and Navarin Basin Planning areas.

The equations are in the following form:

$$\text{EXPENDITURES PER BOE} = x[(i_1(a) + i_2(b))(e_1(a) + e_2(b))] = Y$$
$$\text{TOTAL EXPENDITURES} = (Y)(r) = t$$

Where: x = expenditures per barrel of oil equivalent in the Central Gulf of Mexico Planning area in 1983 dollars; i_1 = the oil cost index (Gulf of Mexico = 1.00); i_2 = the gas cost index (Gulf of Mexico = 1.00); a = oil as a percentage of increased recoverable reserves; b = gas as a percentage of increased recoverable reserves; $(i_1(a) + i_2(b))$ = the composite oil and gas index; e_1 = a factor which represents the oil cost level, net of economies of scale in oil exploration and development costs; e_2 = a factor which represents the gas cost level, net of economies of scale in gas exploration and development costs; $(e_1(a) + e_2(b))$ = the weighted oil and gas cost level adjusted for economies of scale. Y = the unknown, extrapolated expenditure per barrel of oil equivalent

TABLE 4

RESOURCE COST RECOVERY FACTORS

NET OF ECONOMIES OF SCALE

BY OCS PLANNING AREA

OCS Planning Area	Oil	Gas	Oil % of Total BOE	Gas % of Total BOE	Oil/Gas Weighted
Southern California	.95	.52	23.4	76.6	.621
Central/Northern California	.95	.52	85.1	14.9	.885
North Atlantic	.85	.50	19.4	80.6	.567
Mid Atlantic	.67	.50	57.3	42.7	.596
South Atlantic	.67	.50	21.9	78.1	.537
Gulf of Alaska/Cook Inlet	.725	.455	50.9	49.1	.592
Kodiak	.69	.44	0	100*	.44
Norton Basin	.66	.45	57.4	42.6	.570
Navarin Basin	.66	.45	46.8	53.2	.548
St. George Basin	.66	.45	100	0	.66
Diapir Field	.65	.42	100	0	.65

*Includes 13.7% gas condensate

Note: The oil/gas weighted factors were derived by substituting the real values listed above into the following equation: $(e_1(a) + e_2(b))$. See text for further explanation.

Sources: Arthur D. Little, Inc., Minerals Management Service, and Executive Resource Associates.

(1983 dollars); r = the increased recoverable reserves of oil equivalent (millions of bee); t = total extrapolated exploration and development expenditures (millions of 1983 dollars). Substituting values in the two equations, we obtain the following estimated costs:

Southern California Planning Area

Expenditures Per BOE = $17.66 [(1.02(.234) +.716 (.766)) ((.95(.234) + .52 (.766))]
= $17.66 [(.786)(.621)] = $8.61

Total Expenditures = $8.61 (1151.9)= $9,917.8S9 million

Navarin Basin Planning Area

Expenditures Per BOE = $17.66 [(1.17(.468) + 1.30 (.532)) ((.66(.468) + .45(.532))] = $12.00
= $17.66 [(1.24)(.548)1 = $12.00

Total Expenditures = $12.00(2563) = $30,756.000 million

Validation of Methodology

In general, the exploration and development costs projected using this method do not significantly vary from two other independent estimates. For instance, direct equivalent amortized investment and operating costs for oil exploration and development of oil (only) in the Bering Sea was given as approximately $9.75/barrel in 1982 dollars. (Calculated from Dames & Moore data; Harrison, Gordon, S., 1982). Once the cost was escalated to 1983 dollars, using a GNP implicit price deflator of 4.2% (U.S. Commerce Department), the cost per barrel of oil increased to $10.16. The expenditure per BOE developed by Executive Resource Associates for the Navarin Basin, part of the Bering Sea, was $12.00/BOE in 1983 dollars. Analytical limits placed on this study prevent the development of an oil (only) cost for the Navarin Basin which could be equally compared with the Dames and Moore estimate above. Nevertheless, the ERA estimate is reasonably close to the other estimate.

An estimate of both oil and gas exploration and development costs expressed in terms of barrels of oil equivalent for representative tracts located off Santa Barbara County, in the Southern California Planning Area was given as $9.91/BOE in 1984 dollars. (Calculated from Arthur D. Little data, January, 1984) Once the cost was adjusted to 1983 dollars, using the 4.2% cost deflator, the cost per BOE decreased to $9.49. The expenditure per BOE developed by the ERA method was $8.61/BOE, only a 9% variation from the Arthur D. Little estimate.

These two independent estimates generally validate our methodology for exploration and development expense by extrapolation. That validation is important because it permits extrapolation of exploration and development expenditures for all 21 planning areas on a consistent basis, including 16 for which we have no other data.

Discussion of Methodology

Analytically, this approach for approximating exploration and development expenditures should provide adequate extrapolations. Constant cost relationships for exploring and developing both oil and gas were established between planning areas by the composite oil and gas index with the Central Gulf as a base. In addition, a factor which accounts for economies of scale was applied (after being weighted to reflect the projected mix of oil and gas resources in each planning area). Also, the expenditures per BOE represent average costs over the entire resource production increment estimated for each planning area. Finally, the costs are based upon the technology which is forecasted to be employed in each planning area, depending upon its geologic structure(s).

supplies and Sercices: Other Indicators

oil and Gas Production: Operating Cost.

Oil and gas operating costs were developed from annual operating cost data published by the Energy Information Administration for 12 and 18 slot platforms in 100, 300, and 600 feet of water in the Gulf of Mexico. Appropriate platform and water depth data were applied to the development conditions expected in each planning area. The method used to develop operating costs from the given data is as follows. Annual operating costs, such as those given for workover expenditures, were multiplied by nine, the estimated average platform life, and by the expected number of platforms associated with the projected development activities. The resulting number was divided by increased recoverable reserves to obtain the operating cost per BOE.

Oil and Gas Production: Well Drilling Cost.

The well drilling costs (fuel and water) were developed from a combination of NERBC Factbook data (fuel and water requirements), drilling schedules determined from secondary sources, and market prices for diesel fuel (The Journal of Commerce) and water (American Water Works Association) . Once again the dollar equivalent costs were divided by increased recoverable reserves.

Service/Cement Distribution-Bases, Drilling Fluid Suppliers, and Drilling Tool & Equip.Co: Operating Costs.

Labor requirements for the Central Planning area were developed by integrating the NERBC Factbook data with the magnitude and timing of the most likely oil and gas production scenario. The wages were based on NERBC data escalated to 1983 levels by factors obtained from the Bureau of Labor Statistics. The distribution of local to outside employees was determined from the NERBC Factbook and other secondary sources.

The operating costs for other planning areas were extrapolated from the Central Gulf of Mexico. This was accomplished by adjusting labor costs according to the numbers of jobs associated with the labor activities, which were given in secondary sources. It was assumed that the services of one cement distribution base, drilling fluid supplier, and drilling tool and equipment company would be required to support the exploration and development activities in each planning area. This is reasonable to assume because it is unlikely that, outside of the Central and western Gulf of Mexico, these types of support companies exist in significant numbers, if at all.

2. Oil Spill and Oil Spill Cleanup Costs

The estimation of socioeconomic effects of oil spills and their cleanup entail several methodologies. We require an estimate of the oil to be spilled during the project life, a valuation of the lost oil, a cost of cleaning up this spill (onshore and offshore), and perhaps a cost of establishing an oil spill cleanup capability.

Our estimate of oil spill volume include all oil spills associated with OCS activities and, therefore, include spills of crude oil from tankering as well as from exploration, development and production operations The estimated incremental spill volume is based largely on spill information provided in recent EISS. Where EISS have provided ranges of spill volume, the ranges have been collapsed to single values to permit calculations. For instance, ranges of "1,000 to 9,999 barrels* and "10,000 barrels and over" have been approximated with the values of 5,000 barrels and 50,000 barrels, respectively. This influence of factors such as the differences in the depth of the water at the drill site, weather conditions and geological formations bearing hydrocarbon resources on the number of oil spills has not been taken into account.

On the Gulf of Mexico it was necessary to allocate projected oil spill volume to the three planning areas. That allocation was made based on the mean hydrocarbon resources projected for the three planning areas' respective lease offerings.

Extrapolation of oil spill data from one Planning Area to another has been accomplished by applying the ratio of specific oil spill information as a proportion of hydrocarbon mean resource estimate in one Planning Area, to the hydrocarbon mean resource estimate in another Planning Area. A numerical example will illustrate this procedure.

The spilled oil itself was valued at its estimated market value of $29.00 per barrel. The $29.00 value was used for spills related to transportation as well as to drilling and production activities.

Cleanup costs have been projected for the lifespan of OCS operations in the Planning areas. All estimates for non-Alaskan planning areas have been derived from oil spill cleanup costs studies for Amoco Caciz oil spills. The cost estimates for the Alaska Planning Areas have been increased by 25 percent as the result of applying F.W. Dodge construction cost indices.

The total costs of oil spill cleanup for each Planning Area for the lifespan of OCS operations have been obtained by multiplying the costs per spilled barrel in each Planning Area by the estimated total volume of the spills (bbl) over projected lifespan. Cleanup cost effects data are stated in 1983 dollars.

The estimating procedures described should clarify the approximate quality of these cost estimates. However, it is more likely that the estimates overestimate the probable actual costs because the Amoco Cadiz oil spills were large in volume in the area critical to several economically important activities to France such as tourism and agriculture. Extensive cleanup was required and had potential for international implications in the event the oil spill reached the coasts of neighboring countires, such as the United Kingdom, the Netherlands or Belgium. In summary, the oil spill cleanup efforts and resulting costs for the Amoco Cadiz oil spills may be atypical form most of the oil spill cleanup activities.

Note that the actual oil spill cleanup costs for any one oil spill are sensitive to local geomorphological characteristics of the coast. For example, fragmentary but consistent cleanup cost information suggests that the cleanup of oil from a rocky coastline may have unit costs three times as large as similar cleanup activities on a sandy coastline. Also, it is very important to note that the estimated cleanup costs assume that the oil spills in each planning area reach shore (and, thus, are worst case data).

The information and data presented in the various EIS's and other documents in all cases reports only the current or existing cleanup capability (in terms of numbers of dedicated vessels? etc.) without any information regarding the costs of oil spill cleanup capability resulting from additional OCS activities.

In light of this paucity of required information, the following procedure was used to estimate the effects of OCS activities on oil spill cleanup capability costs for the 20 Planning Areas.

- From the information (from EISs, information furnished by Clean Seas, the U.S. Coast Guard, etc.) on existing oil spill cleanup capability for the Southern California Planning Area, and oil spill cleanup capability for the three Gulf of Mexico Planning Areas an inventory of required equipment and personnel was estimated.

- The same sources also furnished the associated annual costs for the lease, operation and maintenance of this equipment as well as associated costs of personnel. In the case of annual equipment costs these were validated against other independent estimates by several marine consulting firms.

- The results of this effort provided us with the total annual costs associated with oil cleanup capability in the Southern California Planning Area and for the three Gulf of Mexico Planning Areas.

- The annual production of hydrocarbons in the Southern California Planning Area and in the three Gulf Coast Planning Areas divided into the total annual costs of the oil spill cleanup capability equipment and personnel yields an approximate estimate of the costs of oil spill cleanup equipment and personnel per B.O.E.

After calculating the absolute cost of the spilled oil and related worst case cleanup, the total absolute value has been divided by the mean hydrocarbon resource estimate for the planning area to obtain the required cost factor per B.O.E.

3* Commercial Fishing Effects Methodology

OCS effects on the fishing industry in all Planning Areas are primarily related to oil spills. Therefore, the effects data presented herein is closely related and frequently derived from information presented in the Oil Spills and Cleanup Costs section.

The commercial fishing industry also is impacted by other factors related to OCS activities, including damage to fishing vessels and fishing gear, curtailment of fishing grounds and reiated conflicts. These non-oil spill factors may be significant in any one area. However, on the Planning Area level their effects on commercial fishing are virtually negligible. Nonetheless, we have taken the non-oil spill factors into account per Planning Area in the following tables.

First, fish landings were identified by specie, by weight and by value for each Planning Area. The source of this information is National Marine Fishery Service (NMFS) printouts. 1977 is the last year for which such information is available, thus we have used it as baseline data. Because OCS-related activities have different impacts on different species of fish it was important to present fish landing data by specie rather than present more recent landing information? especially because annual fish landing levels remain relatively stable.

Next, the effects due to OCS-related oil spills and other effects due to OCS activities required development of percentage reduction of fish landing by specie. Those percent reductions were derived from information in the EIS's for each Planning Area.

Each EIS specifically states that reduced landings of fish, listed by specie, will occur as a result of (1) oil spills and the resulting contamination of fish and the partial destruction of spawning areas; and (2) reduced ocean areas for commercial fishing due to the presence of oil and gas rigs, pipelines, OCS-related rescue traffic and the like. All of the EIS's report OCS impacts on commercial fishing in descriptive terms such as "very high", "high", "very 10W" and so forth. There is no uniformity in the use of these terms and in some EISS (or occasionally within the same EIS) other descriptive terms are employed. For example, 'negligible" may be used instead of "very low". However, in most of the EISs, the above terms have not been expressed quantitatively (e.g., percent reduction of fish landings). On the other hand some EISs do provide both qualitative and quantitative terms for OCS impacts on commercial fishing.

We have determined that the following percentages in reduction of fish landings apply to the descriptive terms listed below.

Very High	- 5% or greater reduction in fish landings.
High	- 2-5% reduction in fish landings.
Moderate	- 1-2% reduction in fish landings.
Low	- 0.01-1% reduction in fish landings.
Very Low	- No measurable reduction in fish landings.

We analyzed the conversion factors for the pertinent EIS's and adopted the following effects terminology and associated values of reduction in fish landings:

Very High	- 8% reduction in landings
High	- 3% reduction in landings
Moderate	- 0.55% reduction in landings
Low	- 0.05 percent reduction in landings
Very Low	- 0 percent reduction in landings

Application of these percentages to fish landing data quantifies the effects of OCS-related activities on commercial fish landings by specie by Planning Area. The effects are estimated in monetary terms (1983 dollars) for the projected lifespan of OCS operations and per B.O.E. estimated mean hydrocarbon resource estimates, and represent worst case projections.

4. Transport and Transport Related Activities

No effects methodology was used.

5. Subsistence: Harvest of Fish and Game

Information on subsistence economies in Alaska is limited, very tentative and subject to significant error. All estimates, therefore, are mere approximations, but reflect the best information currently available.

The methodology used in development of fish and game harvest estimates involved three stages. First, we undertook a comprehensive review of surveys conducted by the State of Alaska Fish and Game Office or local communities. Next, information on harvests of subsistence fish and game on a per capita and per household basis for consumption and for trading purposes between communities was extracted from selected materials. Then, the information was extrapolated to other communities on the basis of subjective judgment of the economic structure of each community, size of native population, opportunity for market-economy employment, annual income statistics, etc.

As previously noted, these procedures can only yield approximations at best because of the limited information available. Furthermore, the data presented do not clearly distinguish between subsistence harvest of fish and game from commercial harvests of the same.

6. Recreation and Tourism

OCS activities which affect recreation and tourism are wide-ranging and can have both positive and negative *effects.* Those activities include oil spills, visual/aesthetic interference by OCS-related structures, and the physical presence of OCS-related structures in on-shore and off-shore areas. In addition, closure of certain areas to tourist and recreation activity may result from OCS-related activities and vessel traffic. The resulting effects may be felt as changes in sale and employment in service sectors and retail trade.

In the past, numerous tourism and recreation studies have been undertaken to analyze these activities within the context of the local economy. The studies have produced thorough and insightful analyses on quantitative impacts of OCS-related activities. The main problem with many of these studies, from the viewpoint of the present research effort, is that almost all cover a limited geographic area. And, there is no uniform set of definitions or standard terms of reference for the tourism/recreation sector. The measures of impacts differ among the local studies both conceptually and theoretically. This renders all of the local studies nearly useless for our purposes because the inputs and results therein cannot be added to regional, state or Planning Area levels. We must either derive our own data for the effects tables on the Planning Area level from analyses of selected OCS activity variables, or use the scarce uniform effects information on OCS-related activities, which is available from the Environmental Impact Statements (EIS's).

We have, therefore, resorted to the information available in the pertinent EIS's because primary analysis is not permitted. Unfortunately, the required information from the EIS's covers only seven Planning Areas along the Atlantic coast, the Gulf of Mexico and the Pacific coast. We do not have tourism and recreation effects data for the Planning Areas in Alaska and for the states of Washington and Oregon.

The estimated tourism and recreation are expressed monetarily in terms of gross revenues for various goods and services sectors that are purchased by participants in recreation activities and/or tourists. The figures represent worst case assumptions. It is possible that losses in gross revenues in one subarea's recreation and tourist activities may well be offset by gains in gross revenues in another subarea within the same Planning Area or in another Planning Area altogether. The potential offset is not reflected in our secondary data.

We have taken EIS estimates of annual losses of tourism and recreation generated dollars due to OCS activities and multiplied them by the projected project lifespan (stated in years). The resulting total loss of tourism and recreation generated dollars was divided by (a) projections of spilled barrels of oil and (b) mean hydrocarbon resource estimates? providing two measures of the losses.

7. Socioeconomic Infrastructure

Total Personal Income:

Total personal income dollar effects were extracted from secondary source documents or developed using the following method. New and local resident employment years over the project life were multiplied by a representative salary for direct and indirect oil and gas workers employed in a specific OCS planning area. Effects per barrel of oil equivalent were calculated by dividing dollar effects by increased recoverable reserves or barrels of oil equivalent. Effects were stated in 1983 dollars.

As used above, new and local resident employment years and project life are defined as follows. First, new resident employment only includes workers who relocated to the planning area after the lease sale. Local resident employment includes workers who held jobs in the planning area prior to the lease sale. New resident and local employment figures are added together for each year during the project life (defined below) to determine employment years.

The project life represents the number of years for which data was presented in the secondary source.

Health Capacity Statistics:

Two health capacity effects measures, hospital beds and physician services, were developed. The estimate for numbers of beds was based on a constant ratio of 3.5 beds per 1,000 new residents in the peak year. The resulting number was multiplied by the average cost of a staffed hospital bed to calculate the total dollar effects.

The estimate for physicians (physician services) was based on a constant ratio of one physician per 1,500 new residents. The 1982 annual income per physician working in a specific OCS planning area was multiplied by the number of physician years over the project life to calculate total dollar effects. Total dollar effects were then divided by expected barrels of oil equivalent to calculate effects per BOE.

As used above, hospital beds, new residents? peak year, and physician years are defined as follows. Hospital beds are defined as fully staffed beds with physician and support labor and supplies. New residents only include people who, as a result of the leasing activity, relocated to the planning area. Peak year is that year during the project life for which the greatest amount of activity is expected to take place. Physician years are derived from new resident population years. New resident population years are calculated by adding annual population increments versus baseline associated with this new resident population over the project life. Then new resident population years are divided by 1,500 to calculate physician years.

Police officers:

Police officer payroll dollar effects were developed using the following method. Average annual new resident population was determined and divided by a constant ratio of one additonal police officer per 500 new residents. The resulting number was multiplied by the project life to determine the total number of police officer service years over the project life. Police officer service years *were* multiplied by the estimated annual salary per officer working in a specific OCS planning area to arrive at police officer dollar effects. Total dollar effects were then divided by expected barrels of oil equivalent to calculate effects per BOE.

As used above, average annual means a constant number, calculated by adding yearly numbers (i.e., new resident population) over the project life and then dividing the resulting number by the number of years in the project life. Police officer service years are defined to mean the number of additional years for which police officers are required "as a result of the leasing activities. For instance, if one additional police officer was hired to meet the needs of 500 new OCS related residents in year 1 and no additional OCS related residents relocated to the area during the remainder of the project life, then, given a 16 year project life, 16 police officer service years would be needed.

Residential Housing Units:

Average annual residential housing dollars effects were calculated in the following way. Planning area specific factors relating demand for housing to average annual new resident population were applied to calculate the demand for residential housing units. The average annual number of residential housing units demanded was then multiplied by the planning area's estimated annual rental housing payment to determine dollar effects. The average annual dollar effects were multiplied by the number of years in the project life to develop total dollar effects which were divided by increased recoverable reserves to estimate effects per BOE.

Above, a housing unit is a house, apartment, a group of rooms, or a single room occupied as separate living quarters.

Total or project life dollar effects represent dollar effects associated with the oil- and gas-related activity throughout the number of years in the project life.

Residential Kilowatt Hour Consumption:

Average annual residential kilowatt hour consumption and dollar effects were calculated in the following way. New customers, based on one new customer per new resident household, were determined on an average annual basis, and increased kilowatt hour use was estimated by multiplying the number of new customers times a representative estimate of sales per customer. Average annual dollar effects were determined by multiplying sales times a representative retail price per kilowatt hour. Total effects per BOE were calculated by dividing project life dollar effects by increased recoverable reserves.

Water Usage:

Average annual residential water usage and dollar effects were calculated in the following way. New residents were determined from secondary data on an average annual basis and increased water consumption was estimated by multiplying a representative water usage factor per person by the number of new residents. The resulting number was then multiplied by a characteristic retail price per unit of water related to usage pricing-bracket in the OCS planning area to develop an average annual dollar effects measure. Effects per BOE were determined by dividing the total project life dollar effects by increased recoverable reserves.

Telephone Lines:

Dollar effects generated by telephone purchases were calculated using the following method. It was assumed that each housing unit demanded by OCS related population will require two phone lines. Therefore, during the peak year the maximum number of phone lines will be purchased. This peak year number of phone lines was multiplied by $35.00, an average cost per phone line, to develop total dollar effects associated with telephone purchases. This dollar effects figure was divided by increased recoverable reserves to calculate effects per BOE. In reality, existing supply of telephone units will partially meet additional demand, so the dollar and per BOE effects may be overstated. However, because no secondary data existed for this effects measure, this method seems to be a reasonable way to develop the effects data. However, the data does not include the costs of service hook-up, dial-tenet and long-distance calling.

As used above, a telephone line is defined as a telephone or telephone unit.

8. Military Activities

No military effects were projected. However, a methodology for such projections was prepared to MMS during the study. In the absence of a response, no further effort was devoted to military effects.

9. Air Quality

Dollar effects were not estimated. However, OCS related effects for emissions were found in the literature in terms of specific air pollutant. The physical weight of those air pollutant emissions by particular OCS activity was divided by the mean hydrocarbon resource estimate to obtain the required measure per B.O.E.

10. Water Quality

Data on the discharge of drill cuttings, drilling muds, and formation waters indicates that impacts on the marine environment from these effluents tend to be local in nature and result primarily from mechanical rather than toxic properties of the substances. The chemical properties of drilling muds, drill cuttings and formation waters are present at levels that are easily diluted and dissolved by receiving waters. Thus, the concentration of each effluent is maintained at an acceptable level, and no harmful effects are imposed upon the marine environment. It must be kept in mind, however, that these conclusions are tentative and may be altered by the results of long-range tests presently in progress. We have therefore concluded that the effects from these *three* pollutants are negligible.

Hydrocarbon emissions, mostly from chronic and acute oil spills, do however, result in damage to the environment. The effects of hydrocarbon emissions on water quality are drawn from the Oil Spills and Cleanup Costs section.

<u>Some caveats apply to the use of these effects data.</u>

For example, if we make the assumption that certain exploration and development **(E&D)** activity will happen somewhere in the nation, then the effect it has in one area or region may be offset partially or completely by the lack of activity in the second area or region. Thus, if exploration and development expenditures are budget-constrained, then the presence of activity in the Mid-Atlantic may add to support services on the Atlantic coast as well as the Gulf coast. If that same E&D activity were added to the Central Gulf of Mexico planning area, the effect on support services would be limited to the Gulf of Mexico. The effects would not necessarily offset each other because of **interregional** differences in characteristics. This subtle difference can be illustrated by the effect of an oil spill on tourism. Oil washing ashore might have little effect on tourism in eastern Maine, but could significantly reduce or increase tourism in Southern California

The effects data which are contained in this report must be used with care. Otherwise errors may result. There are many reasons for caution, including the following:

a. Some measures of effects overlap others. Thus , **double-**counting may occur if effects coefficients in a planning area are simply added together.

b. The effects data are for a planning area or regional activity and are presented as incremental for that area or region. If there are total effects elsewhere in the nation, those effects usually are not considered or mentioned depending upon the assumptions **made,** the effects in an area or region may be partially or completely offset at the national level.

c. Related effects measures may not have been determined on a consistent basis. A specific effects or baseline measure generally is comparable from one planning area or region to another. The inter-area comparability results from the ease of a single source for all areas or from a uniform extrapolation methodology.

Potential inconsistency arises when estimated effects for a subset (e.g., new jobs on supply boats) are estimated in one secondary source and the total category effects **(e.g.,** new oil and gas industry employment) are projected by a second, independent investigator. **As** long as the data is understood to be rough approximations, then the total estimate provides a context for this subset.

d. The baseline and effects data reflect widely varying degreees of precision. The census-based baseline data is very precise compared to less completely surveyed baseline categories (most of the non-census baseline). Yet the Census Bureau data does not present an entirely accurate portrayal of its subject. The same disparities are present in the effects data. Some effects may be extrapolated from one or two data points or old data while others are based ondetailed up-to-date studies.

THE ARCTIC REGION

There have been two Federal Outer Continental Shelf (OCS) oil and gas lease sales in the Alaska Arctic subregion--the Joint Federal/State Beaufort Sea Lease Sale and Lease Sale 71. The sale resulted inthe leasing of 86 tracts of which 24 are federally managed and 62 are managed by the State. There have been 14 exploratory wells drilled on tracts leased in the Joint Sale. Sohio and Exxon are contemplating the development of several Joint Sale tracts managed by the Sate and tracts leased from the State in other sales.

Lease Sale 71 was held on October 13, 1982. The sale offered 338 tracts, and 252 bids were received on 125 tracts. The high bids totaled $2,067,604,786. One hundred twenty-one tracts were leased. Only three other OCS lease sale received higher total cash bonuses.

The most current estimates of risked resources for lands leased in the Federal/State Beaufort Sea Lease Sale and Lease Sale 71 are 910.8 million barrels of oil and 510 billion cubic feet of gas.

Oil- and gas-related activities are also being conducted on other Federal land in the Arctic. TWO lease sales have been held in the National Petroleum Reserve in Alaska (NPRA). A third was scheduled for July 1983.

The state of Alaska has held eight lease sales in the Arctic subregion, including the Joint Federal/State Beaufort Sea Lease Sale. Several commercial discoveries have been made on State leases including the discovery at Prudhoe Bay. Eight additional State lease sales are planned for the subregion.

The Trans-Alaska Pipeline System (TAPS) was developed to transport oil from Prudhoe Bay. A number of gas transportation systems are being discussed.

Exploratory activities of the Joint Sale and Lease Sale 71 area are expected to be supported by the existing facilities at Prudhoe Bay. However, new facilities are expected to be built at other locations as tracts more distant from Prudhoe Bay are explored. The impacts resulting from oil- and gas-related activities are important because of unique environmental conditions and subsistence activities.

The Diapir Field offering covers about 17.2 million acres on the Outer Continental Shelf (OCS). The 3,193 blocks are located in the Beaufort and Chukchi Seas 5 to 257 kilometers offshore in waters that are from 2 to greater than 200 meters deep.

Exploration on the Alaskan North slope has been stimulated by the need for new oil sources to supply the Trans Alaska Pipeline after oil

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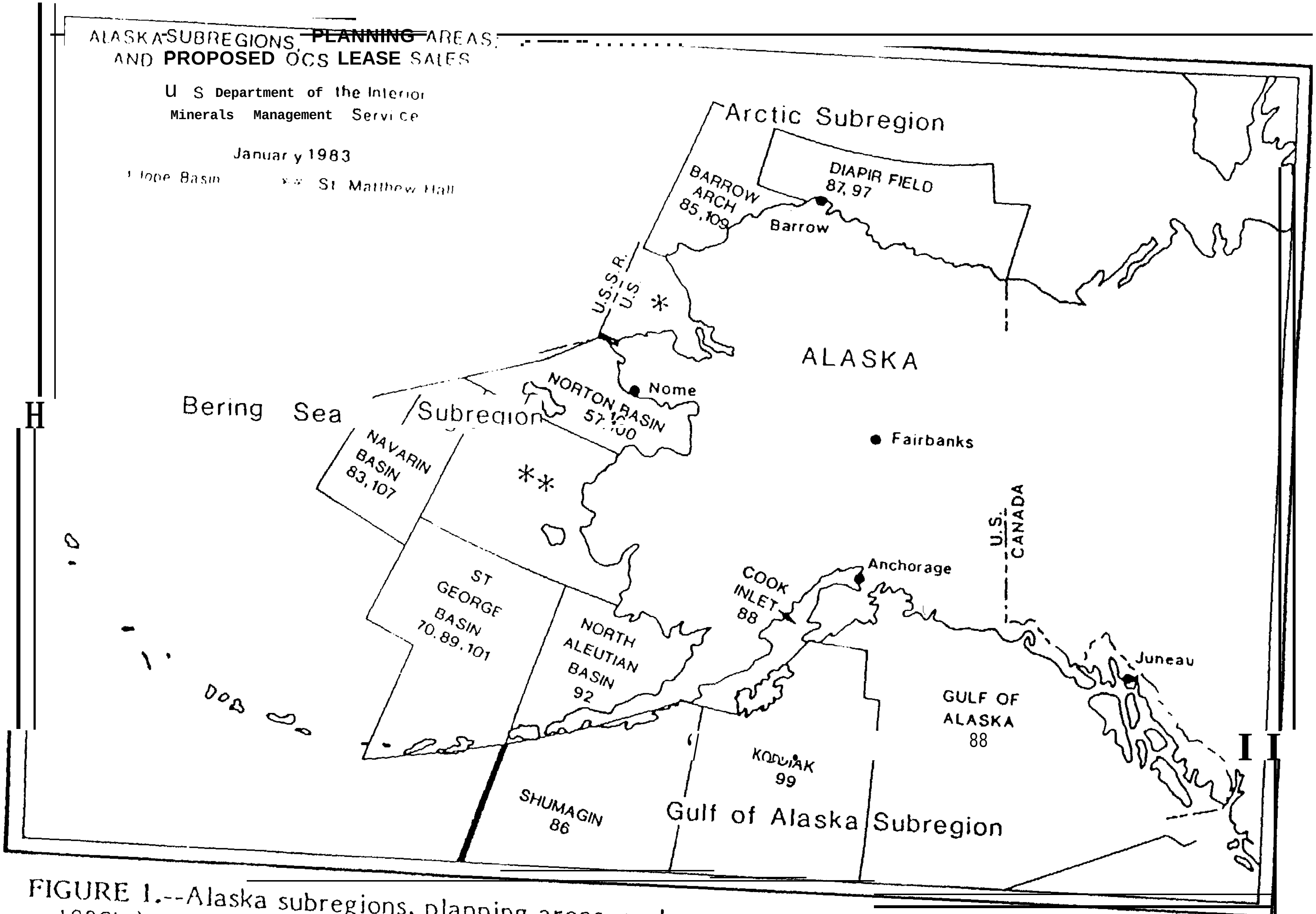

FIGURE 1.--Alaska subregions, planning areas, and proposed OCS lease sales.
1982b.)

production from the Prudhoe Bay oil field begins to decline in 1987. This problem has drawn attention to seismic prospects on the shelf of the Beaufort Sea north and northeast of the Prudhoe Bay and Kuparuk oil fields.

A group of 11 companies drilled a Mukluk structure well, which was abandoned in January 1984 at 9,860 ft. after testing saltwater in all prospective reservoirs. This was a shocking failure after expenditure of $1.5 billion for leases and $120 million for drilling.1/

In 1983 and 1984, federal lease sales opened for exploration three large segments of the Bering Sea, the Norton Sound, St. George and Navarin basins. The navarin basin is the largest of these and it is also the one believed to have the greatest petroleum potential. However, it also has the greatest physical obstacles to oil exploration and development.

1/ WORLD OIL, July 1984, P. 74.

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TAB III

SUPPLIES AND SERVICES

ARCTIC REGION
(Diapir, Barrow Arch, Hope)

1. Effects (Table A(1) (b))

a. Little New Infrastructure is Likely to be Required by Projected Oil and Gas Development

Barring a sudden, dramatic increase in offshore exploration and development, there is little need for expansionary infrastructure. The investment that is foreseen is largely in wells, platforms and pipelines. The resulting reliance on the existing infrastructure is the reason for the absence of investment effects data in Table A(1) (b).

Given the excess capacity and mature infrastructure, the foreseeable OCS oil and gas activity will utilize existing facilities and will sustain present jobs. Since those jobs would no longer exist in the absence of new leases, they are considered incremental and dependent upon oil and gas production from new leases. The incremental jobs appear not only in the production of oil and gas but also throughout the supporting infrastructure.

b. Summary

Although very little new infrastructure is required for an Arctic Region addition of 3,000 million barrels of oil equivalent, approximately $16.41/BOE may be expended in related exploration and development costs over the project life. Some of these expenditures may occur locally, however the majority of the expenditures will probably occur in other areas of Alaska or out of state.

The $16.41/BOE expenditure was extrapolated from the CPA expenditures ($17.66/BOE) and scaled and indexed to reflect different development conditions and resource volume to derive a reasonable estimate for oil and gas related expenditures which may result from the leasing activity.

This overall expenditure includes the investment and/or operation of eight platforms, exploration and development wells, OCS Pipeline, two service bases, drilling support services and support vessels. Onshore processing and transportation facilities are not included in the overall number, but are identified in the effects tables. Approximately 169 annual jobs may be generated over the project life. Please note that these figures are not all-inclusive.

c. Explanation of Dollar Effects Calculations

(1) Effects Documentation and Dollar Equivalent

OCS effects data for most categories have been developed through prior comprehensive studies such as the NERBC-RALI project, its resulting Factbook and extrapolation from one planning area to another. Unless there is glaring conflict with other data, the published effects data will be used to identify local investment, wage, purchase, tax and other-outlay increments associated with OCS activity.

(2) Dollar Effects per Barrel of Oil Equivalent

Once the change effect is identified in dollars, we will relate the change measure to resource production, given a certain assumed level of OCS activity. Since much of the effects data for supplies, services and operations is not variable with production, it makes sense to relate costs over the project life to cumulative recoverable reserves (cumulative production). This provides an average increment per barrel of oil over the life of the project and resource. If effects in a given year were related to production in that same year, the effects/barrel would be infinite in the beginning, dropping rapidly in the middle years as exploration and development efforts end. The effects per barrel will rise toward the end of the project, given relatively level operating costs per platform and declining production.

In order to relate effects to production, we must convert gas to its barrel of oil equivalent. This is accomplished by relating the thermal energy content of gas to oil without considering relative efficiencies during use. Since natural gas contains 1030 BTU per cubic foot and a barrel of oil contains 5.8 million BTU, division of the latter value by the BTU content of natural gas determines the cubic feet (5,631) of gas required to provide the BTUS of a barrel of oil.

Then the effects per barrel of oil equivalent are calculated:

$$\text{Effect per barrel of oil equivalent} = \frac{\text{Dollar wages, investment, taxes, purchases or other outlays}}{\text{Combined production of oil (barrels) and natural gas (cubic feet/5631 cf/barrel)}}$$

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EFFECTS TABLE

Diapir Field PLANNING AREA

Table A(1) (b): SUPPLIES AND SERVICES

	Change			Impacted Area ***	Data Source (s) ****
	Dollar Equiv.	Value/Bbl. of Oil Equiv.	Type **		
OIL AND GAS PRODUCTION					
OPERATING COST [$]					
Labor	$59 X 10^6	$.0196/BOE	Life		EIS (a), EIA (b)
Food	$ 6.22 X 106	$.002/BOE	Life		EIS (a), EIA (b)
Labor Transpor tat ion (Part in support vessels)	$34.63 X 106	$.011/BOE	Life		EIS (a), EIA (b)
Workover	$35. 88 x 106	$.0119/BOE	Life		EIS (a), EIA (b)
Admin./Ins.	$38 X 10^6	$.0126/BOE	Life		EIS[a], EIA[b]
Other	$11.32 x 106	$. 0037/BOE	Life		If IS
WELL DRILLING COST					
Labor					
Fuel	$14.65 X 106	$.0048/BOE	Life		EIS
Trans. in boats, helicopters					
Water (Not all-inclusive)	$135.8 X 10^3	$.00045/BOE	Life	100% Local	EIS[a], NERBC[c]
PIPELINE (OCS)					
GATHERING					
SIZE: DIAM. (in.)					
LENGTH (miles)					
INVESTMENT ($)					
LOCAL : SUPPLIES					
MATERIALS					
LABOR					
OTHER					
TRANSMISSION (incl. Pumping) *					
SIZE: DIAM. (in.)					
LENGTH (miles)					
r NVESTMENT ($)					
LOCAL : LAND					
SUPPLIES					

[a] 3/84 EIS
[b] EIA Costs and Indexes
[c] NERBC Factbook
[d] Bureau of Labor Statistics

EFFECTS TABLE (cant inued)

Diapir Field PLANNING ARSA

Table A(1] (b) : SUPPLIES AND SERVICES

	Change			Impacted Area ***	Data Source(s) ****
	Dollar Equiv.	Value/Bbl. of Oil Equiv.	Type **		
LAEOR					
OTHER					
OPERATING COSTS ($)					
EMPLOYMENT					
LOCAL: LABOR					
ENERGY					
WATER					
TAXES					
OTHER					
OTHER : LABOR					
OTHER					
GAS SEPARATION & TREATMENT FACILITIES					
SIZE [wMCF/Day)					
LAND/FACILITY INVESTMENT ($)					
LOCAL : LAND					
EQUIP.					
SUPPLIES					
LABOR					
OTHER : EQUIP.					
SUPPLIES					
LABOR					
OPERATING COST ($)					
EMPLOYMENT					
LOCAL : LABOR					
SUPPLIES					
WATER					
ENERGY					
TAXES					
OTHER : LABOR					
OTHER					

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EFFECTS TASLE (cent i nued)

Diapir Field PLANNING AREA

Table A(1) (b): SUPPLIES AND SERVICES

	Change			Impacted Area **	Data Source (s) ***
	Dollar Equiv.	Value/Bbl. of Oil Equiv.	Type *		
GAS PROCESSING PLANTS					
NUMBER	0				EIS
CAPACITY (MMCF/D)					
LAND/FAC I LITY					
INVESTKENT ($)					
LOCAL: LAND					
EQUIP.					
SUPPLIES					
LABOR					
OTSER : EQUIP .					
SUPPLIES					
LABOR					
OTHER					
OPERATING COST ($)					
EMPLOYMENT					
LOCAL : LASOR					
SUPPLIES					
WATER					
ENERGY					
TAXES					
OTHER: LABOR					
OTSER					
SERVICE BASES					
NUMBER	2				
ACREAGE/FACILITY					
INVESTWENT					
LAND					
HELICOPTERS					
FACILITIES					
OPERATING COST ($)					
EMPLOYMENT	100 jobs		Annual Ave.		
LOCAL : LABOR	27 $\times 10^6$	. 009/SOE	20 yr. life		EIS*
FUEL					

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EFFECTS TABLE (cent inued)

Diapir Field PLANNING AREA

Table A(1) (b) : SUPPLIES AND SERVICES

	Change: Dollar Equiv.	Change: Value/Bbl. of Oil Equiv.	Change: Type ••	Impacted Area •**	Data Source (s) •***
UTILITIES					
OTHER : LABOR	$9 x 10^6	$.003/BOE			
CEMENT DISTRIBUTION BASES					
ACREAGE/BASE	1 to 5				NERBC
INVESTMENT ($)					
LAND	$(75-loo) x 103		Initial	Local	NERBC
EQuIP.					
OPERATING COSTS ($)					
EMPLOYMENT	+34. 5 jobs		Annual ave.		
LOCAL : LABOR	$17.84 X 10^6	. 0059/BOE	Life	1008 Local	NERBC , BLS
RENT					
TAXES					
OTHER					
DIVING SERVICES					
NUMBER OF COMPANIES					
FEES					
DRILLING FLUID SUPPLIERS					
NUMBER	1				
ACREAGE/BASE	5 Acres				
INVESTMENT ($)					
LAND	$(200-700) x$10^3$		Initial	Local	NERBC
EQUIP.					
OPERATING COST (5)					
EMPLOYMENT	69 jobs		Annual ave.		NERBC
LOCAL : LABOR	$29.20 x106	$. 009/BoE	Life	100% Local	NEREC , BLS
SUPPLIES					
DRILLING TOOL & EQUIP. CO.					
NUMBER	1				
ACREAGE/FACILITY	1 or less		Initial	Local	NERBC
INVESTMENT ($)	Largely inventory		Initial	Outside	NERSC
LAND					
BuILDINGS					

Note: Assume, based on normal operat ional needs, the need for 1 cement distr ibut ion Base, Drilling Fluid Supplier, and Drilling Tool and Equipment Co. No information in EIS.

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<u>EFFECTS TABLE</u> (continued)

Diapir Field PLANNING AREA

Table A(1) (b) : SUPPLIES AND SERVICES

	Change			Impacted Area	Data Source(s)
	Dollar Equiv.	Value/Bbl. of Oil Equiv.	Type *	***	****
MATERIALS					
LABOR					
OTHER					
OTSER : LABOR					
ONSHORE TRANSMISSION					
SIZE: DIAM. (in.)					
LENGTH (miles)					
LAND uSE/MILE					
INVESTMENT ($)					
LOCAL : LAND					
SUPPLIES					
MATERIALS					
LABOR					
OTHER : LABOR					
OTHER					
OPERATING COST ($]					
LOCAL : ENERGY					
LABOR					
TAXES					
OTHER					
REFINERIES					
NUMBER					EISa
CAPACITY (bbl ./d)					
LAND USE/REFINERY					
INVESTMENT ($)					
LOCAL : LAND					
EQUIP.					
SUPPLIES					
LABOR					
OTHER : EQUIP .					
SUPPLIES					

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EFFECTS TABLE (cent inued)

Diapir Field PLANNING AREA

Table A(1) (b) : SUPPLIES AND SERVICES

	Change: Dollar Equiv.	Change: Value/Bbl. of Oil Equiv.	Change: Type **	Impacted Area ***	Data Source(s) ****
OPERATING COST ($)					
EMPLOYMENT					
LOCAL : LABOR					
RBNT					
TAXES					
OTHER					
INDUSTRIAL GASES					
STORAGE FACILITIES					
ACRES/FACILITY					
INVESTMENT ($)					
LAND					
OTHER					
OPERATING COSTS ($)					
LABOR					
TAXES					
SUPFORT VESSELS					
CRRW					
NUMBER	100				EIS[a]
INVESTMENT ($)					
SUPPLY BOAT/TUGS					
NUMBER	10				EIS[a]
INVESTMENT ($)					
OPERATING COSTS					
EMPLOYMENT					
LABOR : LOCAL					
OTHER					
FUEL					
TAXES					
REPAIRS & SERVICING					
DRYDOCKS/RAILWAYS					
NUMBER					

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EFFECTS TABLE (cent i nued)

Diapir Field PLANNING AREA

Table A(l) (b) : SUPPLIES AND SERVICES

	Change			Impacted Area	Data Source(s)
	Dollar Equiv.	Value/Bbl. of oil Equiv.	Type ••		
OPERATING COST ($)					
LABOR					
SUPPLIES					
PIPE COATING YARDS					
NUMBER	0				EIS[a]
ACREAGE/YARD					
INVESTMENT ($)					
LAND					
EQUIP.					
LABOR					
OPERATING COST ($)					
EMPLOYMENT					
LOCAL : LABOR					
WATER					
ENERGY					
PIPE					
SUPPLIES					
OTHER : PIPE					
LABOR					
PLATFORM FABRICATION FACILITIES:	0				EIS[a]
ACREAGE/YARD					
EDS					
PLATFORMS/YR.					
YARDS (Number)					
INVESTMENT ($)					
LOCAL : LAND					
SUPPLIES					
LABOR					
OTHER : LABOR					
OTHER					
OPERATING COST ($)					
EMPLOYMENT					

[a] 12/82 EIS

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EFFECTS TADLE (continued)

Diapir Field PLANNING AREA

Table A(1) (b) : SUPPLIES AND SERVICES

	Change			Impacted Area	Data Source(s)
	Dollar Equiv.	Value/Bbl. of Oil Equiv.	Type **		
LOCAL : LABOR					
WATER					
ENERGY					
TAXES					
OTHER					
OTHER : LABOR					
DREDGING					
DREDGES (Number)					
VOLUME MOVED (Cu Yd)					
EXPENDITURES ($)					
LOCAL: SUPPLIES					
LABOR					
OTSER : PAYROLL					
OTHER					
LANO RECLAMATION					
ARSA (Sq. Mi.)					
EXPENDITURES ($)					
LOCAL : SUPPLIES					
LABOR					
OTHER: PAYROLL					
OTHER					

ARCTIC AREA

1. Supplies and Services

The baseline information data for the Arctic area is shown in Table A(l)(a). This area includes the Diapir Field, Barrow Arch, and Hope.

These data show that the area under projected lease sales would be characterized by:

- thirty eight drill ships
- twenty four semi submersibles
- 5 platforms (Diapir Field)
- two gathering lines, two transmission lines
- five service bases
- ten area vessels
- one dredge

Overall, the supplies and services sector of this area is characterized by supplies and services capacity and infrastructure that is of much smaller scale than that found in the Central Planning Area of the Gulf that is the most developed of all the areas.

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BASELINE TABLE

Table A(1) (a): SUPPLIES AND SERVICES

DIAPIR FIELD PLANNING AREA

Activity Measures	Historical Data 1979-80	Baseline 1983	Forecast Year (1997)	Data Source(s)	Comments
RIGS :					
DRILLSHIPS					
JACK-UPS					
DRILLING	0[b]	0[b]	38[a]	Offshore, **EIS**	Production begins in 1997. Table II-2, 3/84 EIS
STACKED					
CONSTRUCTION					
SUBMERSIBLE	0[b]	0[b]	0[a]	Offshore, EIS	
DRILLING					
STACKED					
CONSTRUCTION					
SEMI-SUBMERSIBLE					
DRILLING	0[b]	0[b]	24a	Offshore, EIS	
STACKED					
CONSTRUCTION					
PLATFORMS					Pipelines expected, lengths undetermined Table II-5, Figure II-1, App. A, EIS 2 landfalls
Ocs	0[c]	0[c]	5[a]	Offshore Stats, EIS	
STATE WATERS					
OCS PIPELINES					
GATHERING LINES (MILES)					
TRANSMISSION LINES					
LENGTH (MILES)					
LANDFALL					
TOTAL CROSS-SECTION **(SQ.IN.)**					
OPERATING CAPACITY					
OIL **(MBBL/DAY)**					
GAS **(MMCF/DAY**					
REFINERIES					
NUMBER					
CRUDE OIL CAPACITY **(MBBL/D)**	0[d]	0[d]	0[d]	IPE[d]	International petroleum encyclopedia
GAS SEPARATION AND TREATMENT FACILITIES **(PRELIM.** PROCESSING)					**(IPE)** assumed to be performed on platforms or production facilities
DAILY CAPACITY					

[a]**FEIS** proposed **Diapir** Field lease offering, June 1984 (3/84 **EIS)**
[b]Offshore Magazine, March, 1983
[c]**Federal** Offshore Statistics, December, 1983
‘International Petroleum Encyclopedia

BASELINE TABLE (continued)

Table A(l)(a): SUPPLIES AND SERVICES

DIAPIR FIELD PLANNING AREA

Activity Measures	Historical Data 1979-80	Baseline 1983	Forecast Year (1997)	Data Source(s)	Comments
FLUID (MBBL/DAY)					
GAS (MMCF/DAY)					
UTILIZATION % (ANNUAL)					
GAS PROCESSING PLANTS					
INPUT CAPACITY (MMCF/DAY)	0[d]	0[d]	0[a]	IPE, EIS	
ACTUAL THROUGHPUT (MMCF/D)					
SERVICE BASES					
EXPLORATORY DRILLING	0	0	2	EIS p. II-6, EIS	
DEVELOPMENT/PRODUCT ION	0	0	3	EIS	
PIPELINE INSTALLATION					
CEMENT DISTRIBUTION BASE					
NUMBER					
ACREAGE					
DIVING SERVICES					
COMPANIES (NUMBERS)					
DRILLING FLUID & CHEMICALS					
SUPPLIER OFFICES (NUMBERS)					
STORAGE SPACE (ACRES)					
DRILLING TOOLS & EQUIPMENT					
SUPPLIER OFFICES (NUMBERS)					
INDUSTRIAL GASES					
SUPPLIER OFFICES (NUMBERS)					
STORAGE SPACE (ACRES OR CU.FT.)					
SUPPORT VESSELS (NUMBERS)					
BY COMPANY LOCATION					
TUGS					
SUPPLY	0[b]	0[b]	10[a]	Offshore, EIS	
OTHER (e.g. CREW VESSELS)					

[a] 3/84 EIS
[b] Offshore Magazine, March, 1983
[c] IPE

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Activity Measures	Historical Data 1979-80	Baseline 1983	Forecast Year (1997)	Data Source(s)	Comments
MACHINERY REPAIRS & SERVICING					
DRYDOCKS (NUMBER)					
EQUIPMENT MAINTENANCE COMPANIES (NUMBER)					
PIPE COATING YARDS					
TEMPORARY (NUMBERS)			0	EIS[a]	Assume to be located
PERMANENT (NUMBERS)			0		in other areas
PLATFORM FABRICATION					
YARDS (NUMBERS)			0	EIS[a]	
CAPACITY (SIMULTANEOUS PLATFORM CONSTRUCTION)					p. IV-34
DREDGING					
DREDGES					
NUMBER					see Tech rep #7
UTILIZATION % (SEASON)					
CAPACITY (CU. YD/DAY)			25,000		
VOLUME MOVED (CU. YDS.)					
LAND RECLAMATION					
COASTAL ACREAGE FILLED					

[a]3/84 EIS

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TAB IV

OIL SPILLS AND OIL SPILL CLEANUP COSTS

2. OIL SPILLS AND CLEANUP COSTS

Introduction

This initial section presents a brief statement on the issues which are addressed in the OCS effects and baseline tables related to oil spills and cleanup costs, i.e., what information is given and how it is broken down by activity and/or source. The data sources for the oil spill and cleanup information are generally listed. Also summarized herein are the methods used to extrapolate specific information available on particular OCS Planning Areas for OCS areas where limited data was available. Finally, the caveats which need to be noted in the use of these data are enumerated.

Although this discussion specifically addresses the Central Gulf of Mexico Planning Area --because it represents the most important region of OCS activity -- the information given serves as a general example of the methods used in reporting and extra-polating data for other Planning Areas. Detailed descriptions of the methodologies and data sources used for the other Planning Areas are included in subsequent sections of this report.

The information on oil spills is presented for oil spills associated with OCS activities which include all spills of crude oil including tankering of crude oil and spillsassociated with exploration, development and production operations.

These OCS oil spills were subdivided into two subcategories:

(1) oil spills from OCS development and production; and

(2) oil spills from OCS-associated transportation.

We also present for each Planning Area aggregate total oil spills . for each of these two subcategories.

The following information is also presented for each Planning Area:

- <u>Probability,</u> (expressed as a percentage) that an oil spill will occur during the lifetime of OCS activities. These probabilities are provided for each of the two OCS activities, i.e., development/production, and transportation. These oil spill probabilities are also broken down by volume of oil spill, i.e., spills greater than 1,000 bbls and spills greater than 10,000 bbls.
- <u>Probability that an oil spill will reach landfall during the lifetime of OCS activities</u>. This probability determines whether or not the oil spill will reach landfall and identifies the destination/location (i.e., county). Two locations/probabilities are reported giving the maximum probability as well as the destination with the lowest probability.
- <u>Cleanup capability,</u> expressed in number and type of equipment available, valued in market prices.
- <u>Cleanup costs</u>, (expressed in dollars) for oil spills which remain in the marine environment and for those which reach the coastline.

All of the tables are divided into two basic categories: (1) baseline tables and (2) effects tables. Baseline tables describe the historical oil spill data, when available, for two historic years, 1978 and 1982. The effects tables project/extrapolate the oil spill data on the basis of historical and current data available in EISS and other literature, and use as the basis for this the mean hydrocarbon resource estimates for a Planning Area. These projections/extrapolations are presented for the years 1978, 1979 or 1990 as warranted by the data. (See more on this below.)

Cost data for the baseline tables is given in current dollars. Cost data for the effects tables has been converted into constant 1983 dollars using CPI.

All oil spill data, unless warranted by logic not to do so, is ultimately expressed as the value or cost in dollars per one barrel of hydrocarbon mean resource estimate for that Planning Area.

As will be discussed in more detail later, the main data source for most Planning Areas is the most current Environmental Impact Statement available for that Planning Area.

Extrapolation of oil spill data from one Planning Area to another has been accomplished by applying the ratio of specific oil spill information as a proportion of hydrocarbon mean resource estimate in one Planning Area, to the hydrocarbon mean resource estimate in another Planning Area. A numerical example will illustrate this procedure.

In the case of "Volume of Oil Spills Due to OCS Production Activities for the Year 1982, we need to determine this information for the three Planning Areas in the Gulf of Mexico. A search through the pertinent EIS and other sources failed to dislose the necessary information for the three Planning Areas separately. However, the EIS for the entire Gulf of Mexico Planning Area, comprising all three Planning Areas, reports that in this combined Planning Area, there were 11,000 bbls of oil spilled due to spills equal to or greater than 1,000 bbls in 1982. The same EIS also reported estimated mean hydrocarbon resources in this combined Planning Area of 463.12 million bbls, that is, hydrocarbon resources that are currently not subject to exploration, development, and production.

At the same time the EIS for the Central Gulf Planning Area provided information on mean hydrocarbon resources of 283.0 million barrels. Given this data, the following formula (1) for estimating/extrapolating the measure of the "Number of Oil Spills Forecasted Due to OCS Related Development and Production" in the Central Gulf Planning Area can be readily constructed:

$$(1) \quad \frac{11{,}000 \text{ bbls oil spilled}}{MHR_{GR}} = \frac{x \text{ bbls of oil spilled}}{MHR_{CGPA}}$$

where

11,000 bbls of oil spilled represents the number of all spills in all three Gulf of Mexico Planning Areas (due to undeveloped mean hydrocarbon resources estimated at 463.1 bbls).

MHR_{GR} = 463.1 bbls of mean hydrocarbon resources in the three Gulf of Mexico Planning Areas.

MHR_{CGPA} = 283.0 bbls of mean hydrocarbon resources in the South Atlantic Planning Area; and

x spills = the unknown volume of oil spilled in the Central Gulf Planning Area.

Given formula (1) and the data presented above, it is possible to solve for "x bbls of oil spilled", which when solved, provides us with an estimate of 6721 bbls of oil spilled in the Central Gulf Planning Area during 1982.

The example above also illustrates some of the simplified assumptions used to extrapolate the number of oil spills from one Planning Area to-another Planning Area. For example, the differences in the depth of the water at the drill site, weather conditions, and geological formations bearing hydrocarbon resources must certainly have a direct bearing on the number of oil spills. None of these has been taken into account.

In a number of other areas, assumptions have been made that impact on the extrapolated results. These are discussed in detail in the commentary accompanying specific tables. However, we will briefly illustrate using two of the more important assumptions used.

(1) The volume of oil spilled. In most cases the information available on the volume of oil spilled is open-ended or has a considerable range. For example, "1,000 bbls to 9,999 bbls" or "10,000 bbls and over". We have used in the initial case, "5,000 bbls" of oil spills and in the second case, "50,000 bbls" of spillage. The assumption may certainly introduce significant approximations in our results.

(2) The costs of cleanup. There is little recent cost information on oil spill cleanup costs. Some of the more detailed engineering cost information is from the 1973-74 period. Oil spill cleanup cost estimates should, therefore, be regarded as rough approximations only.

Finally, we need to explain the more common symbols or lack of them, used for the cells in the tables. Specifically we need to address our use of three symbols:

- o 0 (zero)
- o NA (not available)
- o (blank)

"Zero" has been used for those measures in the effects and baseline tables where we are certain that oil spills have not occurred and are in fact, zero. For example, "zero" has been used for South Atlantic Planning Area for the line item "Number of Oil Spills Due to OCS Related Development and Production" in the baseline table because we have determined that there has been no OCS-related development and production activity in this Planning Area for the historical years.

"Not Available" has been used in those instances where some oil spills may have occurred but we have not been able to determine this from our research effort.

A cell has been left "Blank" in those cases where the required research effort to provide numerical measures for this cell would exceed our instructions from MMS. For example, while it is possible to determine the required information, (i.e., number of oil spills, volume of oil spills, etc.) , for oil spills not related to OCS activities, cells representing these measures have been left blank.

With this general introductory background, we now turn to the oil spill information for the Gulf of Mexico Planning Area.

ALASKA - DIAPIR FIELD PLANNING AREA

SUMMARY OIL SPILLS AND CLEANUP COSTS
EFFECTS TABLES

Table 1 summarizes the cost estimates of oil spills and cleanup costs by effect category. Note that all of the costs in this table are estimated on the basis of per B.O.E. of Mean Hydrocarbon Resource Estimate.

Table 1

SUMMARY OF OIL SPILL AND EFFECTS COSTS IN THE
ALASKA - DIAPIR FIELD PLANNING AREA

Item		Costs/Effects
Cost of oil spills due to production and development per B.O.E. of mean hydrocarbon resource estimates		NA
Cost of oil spills due to transportation per B.O.E. of mean hydrocarbon resource estimates		NA
Total costs of oil spills per B.O.E. of mean hydrocarbon resource estimates		$0.00124
Probabilities of OCS-related oil spill for projected lifespan of OCS operation		
Total:	Oil spill greater than 1,000 bbls)	99%
	Oil spill greater than 10,000 bbls)	96%
Probability oil spill will reach coast		See Text
Cost of oil spill cleanup capability per B.O.E. mean hydrocarbon resource estimate		NA
Total cleanup costs of oil spilled per B.O.E. mean hydrocarbon resource estimates		$0.00403

ALASKA - DIAPIR FIELD PLANNING AREA

OIL SPILL AND CLEANUP COST EFFECTS TABLES

Tables B(1)b through B(3)b present pertinent information on OCS-related oil spill costs resulting from production and development and transportation per B.O.E. of estimated mean hydrocarbon resource estimates for this Planning Area. Other related information, such as total volume of oil spilled, is also presented.

Tables B(4)b and B(5)b present probability information of oil spill occurrences and probability estimates of oil spills reaching specific locations on adjacent coasts of the Planning Area.

Table: B-(1)b

OCS-RELATED OIL SPILLS DUE TO PRODUCTION AND DEVELOPMENT,
BY SIZE OF OIL SPILL,
ALASKA - DIAPIR FIELD PLANNING AREA ,
FOR PROJECTED LIFESPAN OF OCS OPERATIONS 1/

Spill Size Category	Total Volume of Spills (bbl) Over Projected Lifespan	Estimated cost of Oil Spilled Per bbl (1983 $)	Estimated Total Costs of oil Spilled (1983 $)	Cost Per BOE Estimated in Mean Hydrocarbon Resource Estimates 4/ (1983 $)
Less than 1,000 bbls	NA	29.00	NA	NA
1,000 to 9,999 bbls	NA	29.00	NA	NA
10,000 bbls and greater	NA	29.00	NA	NA
Estimated Total bbls	NA	29.00	NA	NA

1/ Assumes 28 year lifespan.

Source: FEIS Proposed Diapir Field Lease Offering, June 1984. (Hereafter 3/84 EIS).

Table: B-(2)b

OCS-RELATED OIL SPILLS DUE TO TRANSPORTATION,
BY SIZE OF OIL SPILL,
ALASKA - DIAPIR PLANNING AREA,
FOR PROJECTED LIFESPAN OF OCS OPERATIONS 1/

Spill Size Category	Total Volume of Spills (bbl) Over Projected Lifespan	Estimated cost of Oil Spilled Per bbl (1983 $)	Estimated Total Costs of oil Spilled (1983 $)	Cost Per BOE Estimated in Mean Hydrocarbon Resource Estimates 4/ (1983 $)
Less than 1,000 bbls	NA	29.00	NA	NA
1,000 to 9,999 bbls	NA	29.00	NA	NA
10,000 bbls and greater	NA	29.00	NA	NA
Estimated Total bbls	NA	29.00	NA	NA

1/ Assumes 28 year lifespan.

Source: 3/84 EIS.

Table: B-(3)b

OCS-RELATED OIL SPILLS, TOTAL,
VOLUME OF OIL SPILLED, BY SIZE OF OIL SPILL,
ALASKA - DIAPIR PLANNING AREA,
'FOR PROJECTED LIFESPAN OF OCS OPERATIONS 1/

Spill Size Category	Total Volume of Spills (bbl) Over Projected Lifespan	Estimated cost of Oil Spilled Per bbl (1983 $)	Estimated Total Costs of Oil Spilled (1983 $)	Cost Per BOE Estimated in Mean Hydrocarbon Resource Estimates 4/ (1983 $)
Less than 1,000 bbls	NA	29.00	NA	NA
1,000 to 9,999 bbls	22,500 2/	29.00	652,500	.00015
10,000 bbls and greater	165,000 3/	29.00	4,785,000	.00109
Estimated Total bbls	187,500	29.00	5,437,500	.00124

1/ Assumes 28 year lifespan.
2/ Estimated assuming 4.5 oil spills with average spill size of 5,000 bbls. See Source.
3/ Estimated assuming 3.3 oil spills with average spill size of 50,000 bbls. See Source.
4/ Assuming 4.38 billion B.O.E. See Source.

Source: 3/84 EIS.

Table B-4b

PROBABILITIES OF OCS-RELATED OIL SPILL OCCURANCE
BY TYPE OF OPERATION,
ALASKA - DIAPIR FIELD PLANNING AREA
FOR PROJECTED LIFESPAN OF OCS OPERATIONS[1/]

Type of Operation	Probability (Percent)	Source	Remarks
Development	NA		
Production	NA		
Transportation	NA		
Overall	99+	3/84 EIS	Spills greater than 1,000 bbls
	96	3/84 EIS	Spills greater than 10,000 bbls

1/ Assuming a 28 year lifespan.

Source: 3/84 EIS.

Table B-5b

PROBABILITIES THAT OCS-RELATED OIL SPILL WILL REACH COAST,
ALASKA - DIAPIR FIELD PLANNING AREA,
FOR PROJECTED LIFESPAN OF OCS OPERATIONS 1/

	Region	Probability (Percent)	Source	Remarks
Region in planning area with greatest chance				
Land Segment	27	5, 24 2/	3/84 EIS	Spill will reach coast within 3 days
Land Segment	27	18, 66 2/	3/84 EIS	Spill will reach coast within 10 days
Land Segment	27 & 39	22, 84 2/	3/84 EIS	Spill will reach coast within 30 days
Region in planning area with smallest chance	many	less than .5	3/84 EIS	

1/ Assuming a 28 year lifespan.
2/ Probability oil spill will reach any land segment.

Source: 3/84 EIS.

OCS-RELATED OIL SPILL CLEANUP COSTS EFFECTS

(Table B-8b)

Table B-8b provides estimates on the costs of oil spill cleanup per B.O.E. and the total cleanup costs for the projected lifespan of OCS operations in the Planning Area. All estimates for non-Alaskan planning areas have been derived from oil spill cleanup cost studies for Amoco Caciz oil spills. The cost estimates for the Alaska Planning Areas have been increased by 25 percent as the result of applying F.W. Dodge construction cost indices.

The total costs of oil spill cleanup for each Planning Area for the lifespan of OCS operations have been obtained by multiplying the costs per B.O.E. in each Planning Area by the estimated total volume of the spills (bbl) over projected lifespan.

The estimating procedures described should clarify the approximate quality of these cost estimates. However, it is more likely that the estimates overestimate the probable actual costs because the Amoco Cadiz oil spills were large in volume in an area critical to several economically important activities to France such as tourism and agriculture. Extensive cleanup was required and had potential for international implications in the event the oil spill reached the coasts of neighboring countries, such as the United Kingdom, the Netherlands or Belgium. In summary, the oil spill cleanup efforts and resulting costs for the Amoco Cadiz oil spills may be atypical from most other oil spill cleanup activities.

Note that the actual oil spill cleanup costs for any one oil spill are sensitive to local geomorphological characteristics of the coast. For example, fragmentary but consistent cleanup cost information suggests that the cleanup of oil from a rocky coastline may have unit costs three times as large as similar cleanup activities on a sandy coastline. Also note that the cleanup costs estimated in Table B-8b assume that the oil spills in the planning area reach shore.

Table B-6b

OCS-RELATED OIL SPILL CLEANUP COST EFFECTS,
ALASKA - DIAPIR FIELD PLANNING AREA
PER B.O.E. AND FOR PROJECTED LIFESPAN
OF OCS OPERATIONS

Cleanup costs for at-sea operations per bbl of oil spilled (in 1983 $) 1/	13.40
Cleanup costs for on-shore operations per bbl of oil spilled (in 1983 $) 1/	80.55 3/
Total cleanup costs (at sea and on shore) per bbl of oil spilled (in 1983 $) 1/	94.25 3,4/
Total cleanup costs (at sea and on shore) for the Planning Area for the projected lifespan of OCS operations (in 1983 $). 2/	17,671,875.00
Total cleanup costs per B.O.E. for mean hydrocarbon resource estimates	$.00403/BOE

1/ See Table B-7a
2/ Based on estimates from Table B-3b and Table B-7a.
3/ Midpoint of range.
4/ Does not add up due to rounding error.

Source: See text.

OCS-RELATED OIL SPILL CLEANUP COSTS - BASELINE

(Table B-4a)

Regulations governing OCS activities require cleanup of all oil spills resulting from such activities. Oil spill cleanup efforts either at sea and/or on shore generate certain costs of personnel> equipment and supplies. There have been a number of attempts to estimate such actual oil spill cleanup costs, most of which were related to major spills such as Santa Barbara, Argo Merchant on the Nantucket Shoals/Georges Bank and others. Subsequent critical review of the various estimates suggests several important problems with these estimates, including:

- o poor engineering cost estimates of oil spill cleanup;
- o unclear conceptual and actual delineation of cleanup costs
- o unclear definition of the cleanup activities, and others.

However, a recently published, detailed study of cleanup and other costs associated with the Amoco Cadiz oil spill [1/] has been acknowledged as currently the best and most accurate source of oil spill cleanup costs. The oil spill clean up cost data from this report is shown in Table B-3a.

1/ Note that this baseline unit cost data are the same used for all Planning Areas and will not be repeated.

Table B-4a

HISTORIC OCS RELATED OIL SPILL CLEAN UP COSTS

Cost Item	Amount (millions of 1978 dollars)	Amount (millions of 1983 dollars) (NOTE B)	Cost Per B.O.E. Spilled 1/ (1978 $)	Cost Per B.O.E. Spilled 1/ (1983 $)
At-Sea Operations				
Rented private vessels	4	5		
Rented pumping equipment	1	2		
Planes and helicopters, private and military	1	2		
French Navy vessels	3	5		
French Navy labor costs	2	3		
Miscellaneous purchased equipment and supplies	.2	.3		
Repairs and maintenance of Navy vessels	1	1		
Chemicals	3	4		
Transportation of Navy equipment and personnel	.01	.2		
TOTAL AT-SEA CLEANUP COSTS	16	22	9.7	13.4
On-Shore Operations				
Army	23	33		
Volunteer labor	2	3		
Police	1	1		
Miscellaneous expenditures by communes	.5	1		
Department of Equipment employees	2	3		
Fire departments	1	1		
Purchased equipment and supplies	21-31	30-45		
Rented equipment	21	29		
Waste transportation and final disposal	10	14		
Fuel	less than .2	less than .2		
Equipment repairs	2	3		
Restoration and bird cleaning	3	5		
Department of lighthouses and buoys	less than .2	less than .2		
Prefecture workers	less than .2	less than .2		
Interest charges	.7	1		
TOTAL ON-SHORE CLEANUP COSTS	87-98	125-140	52.9-59.6	76.0-85.1
TOTAL COSTS	103-114	147-163	62.6-69.3	89.4-99.1

1/ The volume of oil spilled was 1.6 million bbls.

Source: Assessing the Social Costs of Oil Spills: The Amoco Cadiz Case Study, U.S. Department of Commerce, NOAA, July, 1983.

TAB V

COMMERCIAL FISHING AND OTHER SEAWATER BASED COMMERCIAL EXTRACTION ACTIVITY

3. COMMERCIAL FISHING

Introduction

This section presents the effects and baseline tables concerning commercial fishing and OCS-related activities. OCS effects on the fishing industry in all Planning Areas are primarily related to oil spills. Therefore, the effects data presented herein is closely related and frequently derived from information presented in the Oil Spills and Cleanup Costs Section.

The commecial fishing industry is impacted by other factors related to OCS activities, including damage to fishing vessels and fishing gear, curtailment of fishing grounds and related conflicts. These non-oil spill factors may be significant in any one area. However, on the Planning Area level their effects on commercial fishing are virtually negligible. Nonetheless, we have taken the non-oil spill factors into account per Planning Area in the following tables.

The following information is presented for each Planning Area.

- Fish landings by specie by weight and value. This table presents basic information on commercial fishing and is used for subsequent effects tables. Fish landings are identified by specie, by weight and by value for each Planning Area. The source of this information is National Marine Fishery Service (NMFS) printouts. 1977 is the last year for which such information is available, thus we have used it as baseline data. More recent information on fish landings is available, however it list statistics on fish landings by specie only.

Because OCS-related activities have different impacts on different species of fish it was important to present fish landing data by specie rather than present more recent landing information, especially because annual fish landing levels remain relatively stable.

o Estimated effects due to OCS-related activities. The data presented in these tables is listed for each Planning Area and identifies the effects due to OCS-related oil spills, other effects due to OCS activities, and total effects. The effects are shown as percentages of fish landing reduction by specie, where warranted. The values of the effects (percent reduction in annual fish landings) have been derived from information in the EIS's for each Planning Area.

The methodology used in the derivation of the value of effects is important and briefly explained here. The possible negative impacts of various OCS activities on commercial fishing have been recognized and so stated in all of the EISS covering all of the Planning Areas. Each EIS specifically states that reduced landings of fish, listed by specie, will occur as a result of (1) oil spills and the resulting contamination of fish and the partial destruction of spawning areas; and (2) reduced ocean areas for commercial fishing due to the presence of oil and gas rigs, pipelines, OCS-related rescue traffic and the like.

All of the EIS's report OCS impacts on commercial fishing in descriptive terms such as “very high”, “high”, “very low” and so forth. There is no uniformity in the use of these terms and some EISS (or occasionally within the same EIS) other descriptive terms are employed. For example, "negligible" may be used to instead of "very low".

Finally, in most of the EISS, the above terms have not been expressed quantitatively, for example, percent reduction of fish landings. Some EISS, however, provide both qualitative and quantitative terms for OCS impacts on commercial fishing.

We have determined that the following percentages in reduction of fish landings apply to the descriptive terms listed below.

Very High - 5% or greater reduction in fish landings.

High - 2-5% reduction in fish landings.

Moderate - 1-2% reduction in fish landings.

Low - 0.01-1% reduction in fish landings.

Very Low - No measurable reduction in fish landings.

We analyzed the conversion factors for the pertinent EIS's and adopted the following effects terminology and associated values of reduction in fish landings:

- Very high - 8 percent reduction in landings
- High - 3 percent reduction in landings
- Moderate - 0.55 percent reduction in landings
- Low 0.05 percent reduction in landings
- Very low - 0 percent reduction in landings

- Effects due to oil spills, other effects and total effects. The remaining three sets of tables present the effects of OCS-related activities on commercial fish landings by specie by Planning Area. The effects are estimated in monetary terms for the projected lifespan of OCS operations and per B.O.E. estimated mean hydrocarbon resource estimates, and represent worst case projections.

The methodology used for these estimates should clearly indicate the tentative nature of the data presented. Because of the conditional characteristics of oil spills and other OCS-related effects, it is unlikely that the data presented may be improved upon even with additional research.

SUMMARY OF COMMERCIAL FISHING EFFECTS TABLES

ALASKA - DIAPIR FIELD PLANNING AREA

Table 1 summarizes the cost estimates of OCS-related effects on the commercial fishing industry in this Planning Area. Note that all of the costs in this table are estimated on the basis of per B.O.E. of mean hydrocarbon resource estimate.

Table 1

SUMMARY OF OCS ACTIVITY EFFECTS ON COMMERCIAL FISHING
ALASKA - DIAPIR FIELD PLANNING AREA

Item	
Effects of OCS-related oil spills on commercial fishing per B.O.E. of mean hydrocarbon resource estimate	
Effects other than oil spills on commercial fishing per B.O.E. of mean hydrocarbon resource estimate	$0.00/B.O.E.
Total Effects per B.O.E. of mean hydrocarbon resource estimate	

COMMERCIAL FISHING EFFECTS TABLES

ALASKA - DIAPIR FIELD PLANNING AREA

Table C-lb for this Planning Area presents the estimated effects due to OCS-related activities on commercial fish landings by specie. Table C-2b, C-3b and C-4b present these estimates in terms of value or reduced landings by specie, for average year (based on 1977 landings), for projected lifespan of OCS operations and per B.O.E. estimated mean hydrocarbon resource.

Table C-2b presents this information for oil spills only.

Table C-3b presents the value of reduced landings resulting from all effects other than oil spills related to OCS activities.

Table C-4b combines the effects of oil spills with all other effects.

Table C-1b

ESTIMATED EFFECTS DUE TO OCS-RELATED ACTIVITIES
ON COMMERCIAL FISH LANDINGS BY SPECIES,
ALASKA - DIAPIR FIELD PLANNING AREA
(all effects expressed as percentage reduction in resources or landings)

Species	Effects Due to oil spills (% Reduction)	Other Effects (% Reduction)	Total Effects (% Reduction)
Shellfish			
Dungeness Crab	.05	0	.05
King Crab	.05	0	.05
Snow Crab	.05	0	.05
Sea Scallop	.05	0	.05
Shrimp	.05	0	.05
Finfish			
Pacific Cod	.05	0	.05
Pacific Flounder	.05	0	.05
Halibut	.05	0	.05
Sea Herring	.05	0	.05
Pollock	.05	0	.05
Rockfish	.05	0	.05
Sablefish	.05	0	.05
Chinook Salmon	.05	0	.05
Chum Salmon	.05	0	.05
Pink Salmon	.05	0	.05
Red Salmon	.05	0	.05
Silver Salmon	.05	0	.05
All Others	.05	0	.05

Table: C-2b

EFFECTS OF OCS-RELATED OIL SPILLS ON COMMERCIAL FISH LANDINGS BY SPECIE IN ALASKA - DIAPIR FIELD PLANNING AREA

Species	Value of 1977 Landings 1/ (1983-$)	Potential Annual Reduction in Landings Due to OCS-Related Oil Spills 2/ (Percent)	Value of 1977 Reduced Landings (1983-$)	Value of 1977 Reduced Landings Due to OCS-Related Oil Spills for Projected Lifespan 3/ of OCS Operation (1983$)	Value of Reduced Landings Due to OCS-Related Oil Spills Per BOE Estimated Mean Hydro-carbon Estimates (1983 $)
Shellfish					
Dungeness Crab		.05			
King Crab		.05			
Snow Crab		.05			
Sea Scallop		.05			
Shrimp		.05			
		.05			
Finfish					
Pacific Cod		.05			
Pacific Flounder		.05			
Halibut		.05			
Sea Herring		.05			
Pollock		.05			
Rockfish		.05			
Sablefish		.05			
Chinook Salmon		.05			
Chum Salmon		.05			
Pink Salmon		.05			
Red Salmon		.05			
Silver Salmon		.05			
All Others		.05			

1/ Table C-1a; GNP Implicit Price Deflator
2/ Table C-1b
3/ 28 years

Table: C-3b

EFFECTS DUE TO OCS-RELATED ACTIVITIES OTHER THAN OIL SPILLS
ON COMMERCIAL FISH LANDINGS BY SPECIE, IN
ALASKA - DIAPIR FIELD PLANNING AREA

Species	Value of 1977 Landing 1/ (1983 $)	Total Potential Annual Reduction in Landings Due to OCS-Related Activities 2/ (Percent)	Value of Reduced Landings (1983 $)	Total Value of Reduced Landings Due to OCS-Related Activities for Projected Lifespan 3/ of OCS Operation (1983$)	Total Value of Reduced Landings Due to OCS-Related Activities Per BOE Estimated Mean Hydrocarbon Estimates (1983 $)
Shellfish					
Dungeness Crab		0	0	0	0
King Crab		0	0	0	0
Snow Crab		0	0	0	0
Sea Scallop		0	0	0	0
Shrimp		0	0	0	0
Finfish					
Pacific Cod		0	0	0	0
Pacific Flounder		0	0	0	0
Halibut		0	0	0	0
Sea Herring		0	0	0	0
Pollock		0	0	0	0
Rockfish		0	0	0	0
Sablefish		0	0	0	0
Chinook Salmon		0	0	0	0
Chum Salmon		0	0	0	0
Pink Salmon		0	0	0	0
Red Salmon		0	0	0	0
Silver Salmon		0	0	0	0
All Others		0	0	0	0

1/ Table C-la; GNP Implicit Price Deflator
2/ Table C-lb
3/ 28 years

Table: C-4b

TOTAL EFFECTS DUE TO OCS-RELATED ACTIVITIES
ON COMMERCIAL FISH LANDINGS BY SPECIE, IN
ALASKA - DIAPIR FIELD PLANNING AREA

Species	Value of 1977 Landing 1/ (1983 $)	Total Potential Annual Reduction in Landings Due to OCS-Related Activities 2/ (Percent)	Value of Reduced Landings (1983 $)	Total Value of Reduced Landings Due to OCS-Related Activities for Projected Lifespan 3/ of OCS Operation (1983$)	Total Value of Reduced Landings Due to OCS-Related Activities Per BOE Estimated Mean Hydrocarbon Estimates (1983 $)
Shellfish					
Dungeness Crab		.05			
King Crab		.05			
Snow Crab		.05			
Sea Scallop		.05			
Shrimp		.05			
Finfish					
Pacific Cod		.05			
Pacific Flounder		.05			
Halibut		.05			
Sea Herring		.05			
Pollock		.05			
Rockfish		.05			
Sablefish		.05			
Chinook Salmon		.05			
Chum Salmon		.05			
Pink Salmon		.05			
Red Salmon		.05			
Silver Salmon		.05			
All others		.05			

1/ Table C-la; GNP Implicit Price Deflator
2/ Table C-lb
3/ 28 years

TRANSPORT AND TRANSPORT RELATED ACTIVITY

EFFECTS TABLE

Table D(l)(b): PORTS AND HARBORS

Effects Measures	(1) Dollars Equivalent of Effects Measure Change (+/-)	(2) Production (BOE)	(3) Barrels of oil Equivalent (1) (2) = 3	(4) Remarks
(1) Net Change in Wharfage Footage Times the Average Cost Per Foot of Wharfage				
(2) Change in Capacity (DWT) Times the Dollar Value of that Unit of Capacity				

[a] No analysis of effects of OCS activity on ports and harbors was found that provided sufficient detail. Available effects information were not so site specific and detailed. In the abensce of preliminary engineering and tentative siting decisions, available effects information were not site specific and lacked detail.

SOURCES:

2310C

EFFECTS TABLE

Table D(2)(b): RAILROAD STATISTICS

Effects Measures	(1) Dollars Equivalent of Effects Measure Change (+/-)	(2) Production (BOE)	(3) Barrels of oil Equivalent (1) (2) = 3	(4) Remarks
(1) Commodities				
(a) Barrel of Oil Transported Times Average Cost per Barrel				
(b) Tonnage of wheat Transported Times Average Cost per Ton				
(c) Cubic Feet of Gas Transported Times Average Cost per Cubic Feet				
(d) Tonnage of Steel Fabrication Transported Times Average Cost per Ton				

[a]All data sources identified through the Federal Railroad Administration were not pursued because they were proprietary information available only from private industry sources and would require primary data collection efforts. Data that were available were at the national, regional or State levels that could not be segregated for MMS planning areas.

SOURCES:

2313c

EFFECTS TABLE

Table D(3)(b): AIRCRAFT OPERATIONS

Effects Measures	(1) Dollars Equivalent of Effects Measure Change (+/-)	(2) Production (BOE)	(3) Barrels of oil Equivalent (1) (2) = 3	(4) Remarks
(1) Change in Number of Operations Times the Average Value (Cost) of Aircraft Operations				

There are no secondary data sources that provide discussion or analysis of the above effects measures. Data that are available are proprietary and would require primary data collection activities.

SOURCES:

2314c

EFFECTS TABLE

Table D(4)(b): AIRFREIGHT STATISTICS

Effects Measures	(1) Dollars Equivalent of Effects Measure Change (+/-)	(2) Production (BOE)	(3) Barrels of oil Equivalent (1) (2) = 3	(4) Remarks
(1) Airfreight Tonnage				
(a) Incoming				
(b) Outgoing				

Air freight projection associated with OCS activity at the MMS planning area level were not found in the literature. Data that are available are at the national, regional, State or major airports only.

EFFECTS TABLE

Table D(5)(b): COAST GUARD STATISTICS

Effects Measures	(1) Dollars Equivalent of Effects Measure Change (+/-)	(2) Production (BOE)	(3) Barrels of oil Equivalent (1) (2) = 3	(4) Remarks
(1) No. of Sorties Times Average Cost of a Sortie				
(2) No. of Boats Times Average Cost of a Boat				
(3) No. of Aircraft Times Average Cost of an Aircraft				
(4) No. of Personnel Times Average Coast Guard Income/Salary				

[a] The secondary data sources provided by the U.S. Coast Guard were solely baseline data at the national or regional level. No secondary data sources exist which provide discussion on the effects measures identified above applicable to the MMS planning areas under study.

SOURCES:

2317c

Diapir Planning Area

Ports and Harbors

1. Baseline (Table D(l)(a)}

   a. No ports and harbor data is indicated for the Diapir Planning Area.

2287c

BA ELINE TABLE

DIAPIR PLANNING AREA

Table D(l)(a): PORTS AND HARBORS

Activity Measures	Historical Year (1978)	Baseline Year (1982)	Forecast Year (1987)	Data Source(s)	Remarks
(1) Cargo Tonnage	0	0	,		
(2) Number of Vessels Entering Harbors	0 0	0 0			

No port data indicated for Diapir

SOURCES: Waterborne Commerce of the United States; Department of Army Corps of Engineers; Annuals for 1978 and 1982

NOTE : The tonnage and vessel entries are only for the harbors included in the Corps of Engineer's reports.

2334c

BASELINE TABLE

Table D(2)(a): RAILROAD STATISTICS

Effects Measures	Historical Year (1978)	Baseline Year (1982)	Data Source(s)	Remarks
(1) Miles of Track			U.S. Railroad Association and Federal Railway Association	
(2) Miles of Siding				
(3) Commodities (Tonnage)				
(a) Oil				
(b) Gas				
(c) Steel Fabrication				
D. Number of Passengers				

[a] According to the Federal Railway Administration (FRA) there are no secondary data sources on the above activity measures at the OCS Planning Area level or in a county or regional format where data could be aggregated to the OCS Planning Area level. The only secondary data source identified by FRA was the Handy Railroad Atlas of the United States, 1982 and 1977 published by Rand McNally which provide only mileage between key points.

SOURCES:

Diapir Planning Area

Airports

1. Baseline (Table D(3)(a))

The area's air service is dominated by non-hub service with low passengers-per-departure levels

This planning area is served by four airports, all of which are non-hub airports. This is a reflection of the reliance in Alaska placed on air transport as opposed to highway transport.

These airports enplaned 27,201 passengers on 3,046 scheduled flights and 105 passengers on one non-scheduled flight.
0978R

(0978R)

BASELINE TABLE

Table D(3) (a) :
DIAPIR PLANNING AREA

Activity Measures	Baseline Year (1982)	Total Departures Performed
Number of Airports: 4		
Large Hub	0	
Medium Hub	0	
Small Hub	0	
Non-Hub	4	
Number of Enplaned! Passengers:		
Scheduled	27,201	3,046
Non-Scheduled	105	1

(0978R)

Diapir Field Planning Area
Airfreight

1. Baseline (Table D(4)(a))

Despite the extensive reliance on air transport in area, a relatively small volume of airfreight was moved in the area.

As shown in Table D(3)(a), the area is served by four airports. These airports enplaned the relatively small total of 1,246.06 tons of airfreight. Of this total, 460.15 tons were were U.S. Mail. No express freight was enplaned.

The low volume of freight may be explained by the low density of population and low rate of economic activity in this area.

0986R

BASELINE TABLE

Table D(4) (a): Airports
DIAPIR PLANNING AREA

Activity Measures	Baseline Year (1982)
Enplanned revenue tons:	
Freight	785.91
Express	
U.S. Mail	460.15
TOTAL	1,246.06

0986R

Baseline Table
Table D([illegible])(a): Coast Guard Statistics
Diapir Planning Area

1. Baseline (Table D([illegible])(a))

There are no Coast Guard stations in this planning area. Accordingly, the baseline table shows no boats, aircraft, personnel, or sorties for the planning area.

982R/

BASELINE TABLE

Table D(5)(a): COAST GUARD STATISTICS

DIAPIR PLANNING AREA

Activity Measures	Historical Year (1980)	Baseline Year (1982) *	Forecast Year (1987)	Data Source(s)	Remarks
(1) NO. OF STATIONS (UNITS)	0	0		COAST GUARD SEARCH AND RESCUE (SAR) DATE BASE	
(2) NO. OF SORTIES (UNITS)	0	0			
(3) NO. OF BOATS (UNITS)		0			
(4) SORTIES BY BOAT		0			
(5) NO. OF AIRCRAFT (UNITS)		0			
(6) NO. OF PERSONNEL (UNITS)		0			

*U.S. Department of Transportation, U.S. Coast Guard: SAR Statistics for Fiscal Year 1982.

Diapir Planning Area
Highway Mileage

1. Baseline (Table D(6)(a))

a. The area is rural with few highways.

The baseline table data show that the Diapir Planning Area (DPA) is very much a rural area with little in the way of highways despite the vastness of the area it includes. The DPA contains only 151.4 miles of highway, all of it rural. This is a consequence of the extreme northern location of the DPA, the low density of population, and the reliance on aircraft and ocean vessels for the hauling of freight to areas any distance from the main population centers.

b. New oil and gas development will likely not result in expansion of the local highway sys tern

OCS operations in the DPA are expected to be supplied by air and vessel from central supply and support bases. These bases will likely be supplied themselves exclusively by air and vessel, and require little or nothing in the way of new highways.

c. **Summary**

OCS operations in the DPA will not result in the development of significant amounts of new highways in the DPA.

984R/

BASELINE TABLE

Table D(6)(a): HIGHWAY MILEAGE

DIAPIR PLANNING AREA

Activity Measures	Historical Year (1980)	Baseline Year (1982)	Forecast Year (1987)	Data Source(s)	Remarks
(1) Highway Mileage (Units)					
(a) Rural	151.4				
(b) Urban	0.0				

Source: Highway Performance Monitoring System (HPMS) December 31, 1982, U.S. Department of Transportation, Federal Hwy Administration, Office of Planning, Highway Statistics Division.

Hope Planning Area

Ports and Harbors

1. <u>Baseline (Table D(l)(a))</u>

   a. No ports and harbor data is indicated for the Hope Planning Area.

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HOPE PLANNING AREA

Table D(1) (a): PORTS AND HARBORS

Activity Measures	Historical Year (1978)	Baseline Year (1982)	Forecast Year (1987)	Data Source(s)	Remarks
(1) Cargo Tonnage	0	0			
(2) Number of Vessels Entering Harbors	0 0	0 0			

No port data indicated for Hope

SOURCES: Waterborne Commerce of the United States; Department of Army Corps of Engineers; Annuals for 1978 and 1982

NOTE : The tonnage and vessel entries are only for the harbors included in the Corps of Engineer's reports.

2334c

BASELINE TABLE

Table D(2)(a): RAILROAD STATISTICS

Effects Measures	Historical Year (1978)	Baseline Year (1982)	Data Source(s)	Remarks
(1) Miles of Track			U.S. Railroad Association and Federal Railway Association	
(2) Miles of Siding				
(3) Commodities (Tonnage)				
(a) Oil				
(b) Gas				
(c) Steel Fabrication				
D. Number of Passengers				

[a] According to the Federal Railway Administration (FRA) there are no secondary data sources on the above activity measures at the OCS Planning Area level or in a county or regional format where data could be aggregated to the OCS Planning Area level. The only secondary data source identified by FRA was the Handy Railroad Atlas of the United States, 1982 and 1977 published by Rand McNally which provide only mileage between key points.

SOURCES:

2312c

Hope Planning Area
Airports

1. Baseline (Table D(3)(a))

The area's air service is dominated by non-hub service with low passengers-per-departure levels

This planning area is served by 11 airports, all of which are non-hub airports. This is a reflection of the reliance in Alaska placed on air transport as opposed to highway transport.

These airports enplaned 40,335 passengers on 10,226 scheduled flights and 96 passengers on 20 non-scheduled flights.
0978R

(0978R)

BASELINE TABLE

Table D(3)(a):
HOPE PLANNING AREA

Activity Measures	Baseline Year (1982)	Total Departures Performed
Number of Airports: 11		
Large Hub	0	
Medium Hub	0	
Small Hub	0	
Non-Hub	11	
Number Of Enplaned Passengers:		
Scheduled	40,335	10,226
Non-Scheduled	96	20

0978R

(0978R)

Hope Basin Planning Area
Airfreight

1. <u>Baseline (Table D(4)(a))</u>

<u>Despite the extensive reliance on air transport in area, a relatively small volume of airfreight was moved in the area.</u>

As shown in Table D(3)(a), the area is served by eleven airports. These airports enplaned the relatively small total of 4,544.66 tons of airfreight. of this total, 2,436.26 tons were were U.S. Mail. No express freight was enplaned.

The low volume of freight may be explained by the low density of population and low rate of economic activity in this area.

0986R

BASELINE TABLE

Table D(4)(a): Airports
HOPE PLANNING AREA

Activity Measures	Baseline Year (1982)
Enplanned revenue tons:	
Freight	2,108.40
Express	
U.S. Mail	2,436.26
TOTAL	4,544.66

0986R

Baseline Table
Table D(5)(a): Coast Guard Statistics
Hope Planning Area

1. <u>Baseline (Table D(5)(a))</u>

There are no Coast Guard stations in this planning area. Accordingly, the baseline table shows no boats, aircraft, personnel, or sorties for the planning area.

982R/

Table D(5) (a) : COAST GUARD STATISTICS

HOPE PLANNING AREA

Activity Measures	Historical Year (1980)	Baseline Year (1982) *	Forecast Year (1987)	Data Source(s)	Remarks
(1) NO. OF STATIONS (UNITS)	0	0		COAST GUARD SEARCH AND RESCUE (SAR) DATE BASE	
(2) NO. OF SORTIES (UNITS)	0	0			
(3) NO. OF BOATS (UNITS)		0			
(4) SORTIES BY BOAT		0			
(5) NO. OF AIRCRAFT (UNITS)		0			
(6) NO. OF PERSONNEL (UNITS)		0			

*U.S. Department of Transportation, U.S. Coast Guard: SAR Statistics for Fiscal Year 1982.

Hope Planning Area
Highway Mileage

1. Baseline (Table D(6)(a))

a. The area is rural with few highways.

The baseline table data show that the Hope Planning Area (HPA) is very much a rural area with little in the way of highways despite the vastness of the area it includes. The HPA contains only 27.9 miles of highway, all of it rural. This is a consequence of the unique geography of Alaska, the low density of population, and the reliance on aircraft and ocean vessels for the hauling of freight to areas any distance from the main population centers.

b. New oil and gas development will likely not result in expansion of the local highway system

OCS operations in the HPA are expected to be supplied by air and vessel from central supply and support bases. These bases will likely be supplied themselves exclusively by air and vessel, and require little or nothing in the way of new highways.

c. Summary

OCS operations in the HPA will not result in the development of significant amounts of new highways in the HPA.

984R/

BASELINE TABLE

Table D(6)(a): HIGHWAY MILEAGE

HOPE PLANNING AREA

Activity Measures	Historical Year (1980)	Baseline Year (1982)	Forecast Year (1987)	Data Source(s)	Remarks
(1) Highway Mileage (Units)					
(a) Rural	27.9				
(b) Urban	0.0				

Source: Highway Performance Monitoring System (HPMS) December 31, 1982, U.S. Department of Transportation, Federal Hwy. Administration, Office of Planning, Highway Statistics Division.

984R/

TAB VII

SUBSISTENCE

Subsistence

Subsistence activities are an integral part of Alaska's economic, cultural and social system. This is particularly true for the different native Alaska groups who are indigenous to the land and whose historical roots often go back to premodern history periods.

OCS development is of critical significance to the many Alaska communities - mainly the 148 villages - where most subsistence activity takes place. While most of the lower 48 States are urbanized and economically and politically developed in a post industrial state, Alaska and its native villages are not.

Host people in these villages continue to live in small communities where daily life is not in direct contact with industrial and urban patterns.

OCS oil and gas development has powerful potential to radically transform the patterns of daily life in these areas. OCS activity can change the natural environment, the social routines to which people are accustomed, and the size and characteristics of the population.

One vital element of life in these villages is that of subsistence activities. These activities have deep economic, cultural and psychological roles to play in people's lives in these villages.

Activities such as hunting, fishing, and berry gathering provide essential food and sustenance, reinforce social and cultural values, and provide reaffirmation for entire communities for their role in the world.

Concern over the effect of OCS activity on such subsistence activity is not "romantic" in the sense of non-reflective protection of traditional lifestyles. Rather, it is concern over the potential destruction of economically viable and satisfying human environments and how these beneficial aspects of a community can be protected while still allowing oil and gas development in these areas.[1/]

In this project, an attempt was made to measure subsistence activity in Alaska.

[1/] Many of the issues imbedded in this problem are well known to students of modernization where clashes between "modernizers" and "traditionalists" define the conflicting issues between forces of modernization, usually urban-industrial ,and traditional lifestyle, usually rural agrarian. There is an extensive literature on this. See in particular, Social Impact Assessment in Small Communities, Roy T. Bowles, (Toronto: Butterworth, 1981).

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The intended measure of subsistence activity for baseline and effects data was to analyze fishing and hunting liscences issued by planning area. From this the quantity of subsistence harvest was to be determined and a monetary value attached to this. This would have provided a quantified measure of subsistence activity,

For reasons given below this objective was only partially achieved.

Subsistence as a pattern of hunting and fishing in Alaska is difficult to define and data which quantify harvests, user groups and market values are difficult if not impossible to obtain. Since geographic areas have great cultural diversity in Alaska and, consequently, great diversity in lifestyles and socioeconomic systems, there are little data collected on subsistence issues on a planning area on statewide scale. The Subsistence Division of the Alaska Department of Fish and Game is the major source of studies on issues relevant to this project.

In some parts of the state fishing and hunting for local use are part of a cohesive socioeconomic system that has existed for generations, In other areas, usually the more urban regions, subsistence activities are supplementary to wage earning and occur at times not in conflict with a regular work schedule.

With respect to specific categories of information on subsistence such as number of persons engaged in such activities, there are difficulties due to the fact that data are not available for Alaska/OCS planning areas, The best potential source was the license data for hunting and fishing. However, it is impossible to determine from fishing and hunting licenses issued by the state if the fishing or hunting activity will be for subsistence purposes. Further, it is not possible to determine whether or not the license holder is Native or non-Native. Subsistence permits are sold in a few locations; however, they are non-commercial gear permits and have no indication of the socioeconomic standing or intent of the licensee.

Throughout Alaska, there are subsistence producers and subsistence consumers. Household groups have some of each. Some households do not participate in the actual gathering of food products but are part of an exchange network so that they are consuming subsistence resources. In small (less than 200) communities up to ninety percent of all residents participate in subsistence activities as producers, consumers, or both.

As evidenced in the data accumulated by Fish and Game, there is little correlation between average income and subsistence activity. Frequency and consistency in subsistence activity have more to do with geographic location, community size, type of economy and ethnic backgrounds of residents than with income levels. In communities where higher percentages of residents are employed in full-time, twelve month positions, subsistence hunting and fishing are of secondary importance to

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wage employment. In areas where employment tends to be more sporadic and seasonal. subsistence activities play a more major role in lifestyle and household activity. Further, some households with very low income levels participate less in subsistence activities than those with higher incomes as successful hunting and fishing require purchase and maintenance of equipment.

Economists and anthropologists currently working on subsistence issues are seeking ways to place market prices on subsistence resources. Alaska Department of Fish and Game, Subsistence Division, and anthropologists in Canada are working on developing a methodology to place a monetary value on subsistence resources but at this time there has been no agreement on how to do so. Of course, no data yet exist on the monetary value of subsistence activities.

Following is information on Alaska communities and areas in the state which provide the only available quantitative data for baseline and effects tables.

Similar data for other Alaska villages are not available.[1/]

Data on subsistence activity were only available for a portion of Alaska's villages.[2/] Subsistence harvest data is recorded where it was available. However, no monetary value has been attached to these harvests as we accepted the counsel of the State of Alaska Fish and Game, Subsistence Division that there presently was no accepted method by which this could be done.

[1/]The Subsistence Divison is developing similar data for these villages but this is a multi-year endeavor.

[2/]All data are taken from the series of technical reports published by The Subsistence Division State of Alaska Fish and Game Department. These are cited at the end of this section.

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BASELINE TABLE

Table E(l)(a): SUBSISTENCE

Activity Measures	Historical Year	Baseline Year	Forecast Year	Data Source(s)	Remarks
(1) Number of persons and families participating in subsistence living native groups non-native groups					
(2) Number of subsistence licenses granted native groups non-native groups	Not available.	See narrative.			
(3) Weight and market value of subsistence creatures caught - fish mammals shellfish	Not available.	Resource categories alternative measure. Some weights per household available in certain regions. See narrative.			

*Native Groups includes all Alaskan natives, Indians, etc.

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PART E. ALASKAN NATIVES

Introduction

In this part of the report, data relating to Alaskan natives is presented. This data is primarily demographic in nature and is presented in an effort to reflect the special situation presented in Alaska by the predominance in rural areas of native cultures.

The first set of data tables present figures on the native villages in each planning area in Alaska, including population, households, and family income. This data is presented for the total populations of each planning area's native villages and for the native population of the native villages.

In these tables the data presented are totals of all the native viallages in each planning area. The planning areas contain from seven to 48 native villages each. The number of villages in each planning area is noted on the tables. Together the planning areas contain 146 native villages.

The definition of "native village" is that used in the 1980 Census of Housing. Specifically, native villages include tribes, bands, clans, groups, villages, communities, or associations which were listed in sections 11 and 16 of the Alaska Native Claims Settlement Act, or which met the requirements of the act, and which on April 1, 1970, were composed of 25 or more Alaska natives. The 1980 Census information presented in the tables reflects a suppression of data from villages of fewer than 30 pesons or fewer than ten housing units, A comparison of the 1980 data with data from the 1970 Census, which suppressed only villages of five persons or less, showed that the .1980 suppression rule did not significantly affect the data.

In some instances the data presented in the tables in this Part E of the report are inconsistent with those presented in Part G, dealing with basic demography. This appears to be a problem of differing definitional criteria in the two data bases relied upon in the two parts. The inconsistencies are not so great that they affect the usefulness of the data, The differences are slight, certainly not on the scale of orders of magnitude, allowing the data to be used to show accurately the relationships between the characteristics of the different planning areas.

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Diapir Planning Area
Native Villages

1. Baseline (Table E(l)(a))

The total population of the native villages in the Diapir planning area in 1980, the baseline year, was 3,357. Of this number, 2,728 persons were Alaskan natives. These persons were organized into 888 households, of which 612 were native households. The average family income for all families in the native villages was $38,169 with Native families having an average income of $35,618.

These figures indicate that, as would be expected, natives make up over 81 percent of the population of the native villages. While numerically dominant, natives are less well off economically, with native family income about 93 percent that of the average family income of all families in native villages in this planning area. Natives make up over 80 percent of the public assistance recipients in the planning area's native villages, and occupy over 70 percent of the substandard houses.

2280c

BASELINE TABLE

Table E(l)(a): NATIVE VILLAGE DEMOGRAPHICS

DIAPIR PLANNING AREA

Activity Measures	Historical Year (1970)	Baseline Year (1980)	Data Source(s)
POPULATION			
Total	*2,629*	*3,357*	
Native	*2,478*	*2,728*	
HOUSEHOLDS			
Total	508	888	
Native	430	612	
FAMILY INCOME - TOTAL			
Income Units	444	668	
Average Income	9,301	$38,169	
NATIVE FAMILY INCOME			
Income Units	N/A	*498*	
Average Income	N/A	*$35,618*	

Diapir Field Planning Area includes 7 native villages.

Source: Bureau of the Census STF-4 files for 1980.

Note: Total of native population data are suppressed for villages if fewer than 30 people are in the category. Housing data of fewer than 10 units is suppressed also.

2303c

BASELINE TABLE

Table E(l)(a): NATIVE VILLAGE DEMOGRAPHICS

DIAPIR PLANNING AREA

Activity Measures	Historical Year (1970)	Baseline Year (1980)	Forecast Year (1987)	Data Source(s)
WELFARE, PUBLIC ASSISTANCE RECIPIENTS				
Total	116	91		
Native	N/A	73		
OCCUPIED HOUSES				
Total	497	874		
Native	415	562		
SUBSTANDARD HOUSES				
Total	432	680		
Native	N/A	484		

2303c

Hope Planning Area
Native Villages

1. Baseline (Table E(l)(a))

The total population of the native villages in the Hope planning area in 1980, the baseline year, was 4,265. Of this number, 3,630 persons were Alaskan natives. These persons were organized into 1,037 households, of which 761 were native households. The average family income for all families in the native villages was $22,611 with native families having an average income of $20,570.

These figures indicate that, as would be expected, natives make up over 73 percent of the population of the native villages. While numerically dominant, natives are less well off economically, with native family income about 91 percent that of the average family income of all families in native villages in this planning area. Natives make up more than half of the public assistance recipients in the planning area's native villages, but occupy less than 43 percent of the substandard houses.

2280c

BASELINE TABLE

Table E(l)(a): NATIVE VILLAGE DEMOGRAPHICS

HOPE PLANNING AREA

Activity Measures	Historical Year (1970)	Baseline Year (1980)	Forecast Year	Data Source(s)
POPULATION				
Total	3,616	4,265		
Native	3,222	3,630		
HOUSEHOLDS				
Total	680	1,037		
Native	585	761		
FAMILY INCOME - TOTAL				
Income Units	592	797		
Average Income	8,425	$22,611		
NATIVE FAMILY INCOME				
Income Units	N/A	427		
Average Income	N/A	$20,570		

Hope Basin Planning Area includes 10 native villages.

Source: Bureau of the Census STF-4 files for 1980.

Note: Total of native population data are suppressed for villages if fewer than 30 people are in the category. Housing data of fewer than 10 units is suppressed also.

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BASELINE TABLE

Table E(1) (a) : NATIVE VILLAGE DEMOGRAPHICS

HOPE PLANNING AREA

Activity Measures	Historical Year (1970)	Baseline Year (1980)	Forecast Year (1987)	Data Source(s)
WELFARE, PUBLIC ASSISTANCE RECIPIENTS				
Total	149	211		
Native	N/A	115		
OCCUPIED HOUSES				
Total	661	1,008		
Native	536	488		
SUBSTANDARD HOUSES				
Total	559	415		
Native	N/A	178		

2303c

8.5 Subsistence

Table E(2)(a) presents data on the number of hunting and fishing licenses issued by the State of Alaska Fish and Game Department. The data is shown by village and is for 1982-1983,

It has not been possible to obtain accurate data on the amount of subsistence harvest gathered for each license issued or to distinguish between how many licenses were issued to native versus non-native users.*

A further complication is that one license may be issued to a single person but that person hunts or fishes for extended families or even an entire village. The catch he brings in is then distributed to many families and households, each of which is thereby dependent on subsistence activities and harvests. The extent of such sharing of subsistence harvests is unknown, except to the point that it is a very common practice among most Alaskan native groups.

Further, a license may be issued in one village but the hunter or fisherman is from another village and simply applied and received the license in the first village for convenience reasons. His catch or harvest, however, will be taken to the village from which he originated rather than the one where he applied for a license.

For the above and other reasons, it is presently impossible to reliably identify the level of subsistence activity by village or OCS planning area from the license data.

Nevertheless, in the absence of any other better data, the license data is presented. It is useful for indicating, in order of magnitude proportions, the potential level of subsistence activity in the Alaskan regions and the number of persons directly involved in such activity as primary gatherers,

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* Social and cultural anthropologists who are familiar with Alaska field work have indicated to us that with further analysis actual harvest amounts could be identified, However, such analysis was beyond the scope of this project.

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BASELINE TABLE

Table E(2)(a): HUNTING RELATED TO SUBSISTENCE ACTIVITIES - 1960, 1970 AND 1980
DIAPIR PLANNING AREA

I tern	Villages x, y, z	1983 Villages	Source(s)	Comments
Total hunting licenses issued	Hunting Hunting, Trapping Hunting, Sport Fishing Hunting, Trapping, Sport Fishing	271 18 339 124		State of Alaska Dept. of Revenue Data Processing Div.
Total hunting licenses issued to natives				
Total hunting licenses issued to non-natives				
Total hunting licenses as proportion of total population				
Total native hunting licenses as proportion of native population				
Total non-native hunting licenses as proportion of non-native population				

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BASELINE TABLE

Table E(2) (a): HUNTING RELATED TO SUBSISTENCE ACTIVITIES - 1960, 1970 AND 1980
HOPE PLANNING AREA

Item	Villages x, y, z	1983 Villages	Source(s)	Comments
Total hunting licenses issued	Hunting Hunting, Trapping Hunting, Sport Fishing Hunting, Trapping, Sport Fishing	229 197 125 174		State of Alaska Dept. of Revenue Data Processing Div.
Total hunting licenses issued to natives				
Total hunting licenses issued to non-natives				
Total hunting licenses as proportion of total population				
Total native hunting licenses as proportion of native population				
[illegible] hunting license as proportion of non-native population				

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SUBSISTENCE HARVEST OF FISH AND GAME

Tables E-3a present estimates of subsistence fish and game harvests for all major communities in each Planning Area. The data is given as pounds of fish and game harvested by each community.

Information on subsistnece economies in Alaska is limited, very tentative and subject to significant error. All estimates, therefore, are mere approximations, but reflect the best information currently available.

The methodology used for the estimates is as follows:

1. Undertake comprehensive review of surveys conducted by the State of Alaska Fish and Game Office or local communities,

2. This review provided information on harvests of subsistence fish and game on a per capita and per household basis, for consumption and for trading purposes between communities.

3. The information was extrapolated to other communities on the basis of subjective judgment of the economic structure of each community, size of native population, opportunity for market-economy employment, annual income statistics, etc.

As previously noted, these procedures can only yield approximations at best because of the limited information available. Furthermore, the data presented does not clearly distinguish between subsistence harvests of fish and game from commercial harvests of the same.

Table E-3a

TOTAL POPULATION, ESTIMATES OF FISH AND GAME HARVESTS
FOR SUBSISTENCE BY COMMUNITY,
ALASKA - DIAPIR FIELD PLANNING AREA, 1980

Community	Population	Estimate of Fish and Game Harvest (thousand lbs. dressed weight)
Anaktuvuk Pass	204	122.4-204.0
Atkasook	113	67.8-113.0
Barrow	2207	1324.2-2207.0
Kaktovik	171	102.6-171.0
Nuigsut	196	161.7-269.5
Point Lay	64	52.8-88.0
Point Hope	472	389.4-649.0
Wainwright	402	331.7-552.8

Table E-3a

TOTAL POPULATION, ESTIMATES OF FISH AND GAME HARVESTS
FOR SUBSISTENCE BY COMMUNITY,
ALASKA - HOPE BASIN PLANNING AREA, 1980

Community	Population	Estimate of Fish and Game Harvest (thousand lbs. dressed weight)
Ambler	191	114.6-191.0
Buckland	169	101.4-169.0
Deering	154	127.1-211.8
Kiana	335	201.0-335.0
Kivalina	245	202.1-336.9
Kobuk	57	47.0-78.4
Kotzebue	2054	924.3-1540.5
Noatak	275	226.9-378.1
Noorvik	507	304.2-507.0
Selavik	360	297.0-495.0
Shunghak	193	130.3-217.1

Diapir Field Planning Area
Native Employment

1. Baseline (Table E(2)(a)).

   a. Natives found in construction, education, and public administration.

In the Diapir Field Planning Area, natives are found in several industries, including construction, education, and public administration. While these three fields are far and away the most significant sources of native employment, others areas of concentration include retail trade, transportation, and communications.

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BASELINE TABLE
E(2)(a) EMPLOYMENT BY OcCUPATION

DIAPIR PLANNING AREA

COUNT OF EMPLOYED PERSONS 16 YEARS AND OVER BY SEX (2J BY INDUSTRY (49)	TOTAL POPULATION	NATIVE POPULATION
TuTAL:		
AGRICULTURE	134	5
FORESTRY AND FISHERIES	134	19
MINING	500	40
CONSTRUCTION	2314	415
MANUFACTURING:		
NONDURABLE GOODS:		
FOOD AND KINDRED	53	4
TExTILE MILL PRODUCTS	4	4
APPAREL AND OTHER	31	
PRINTINGs PUBLISHING,	198	
CHEMICALS AND ALLIED	18	
PAPER AND ALLIED PROD	48	
PETROLEUM AND COAL	54	6
OTHER NONDURABLE GOOD	24	7
DURABLE GOODS:		
FURNITURE,LUMBER,WOOE	153	s
PRIMARY METAL INOUST.	13	
FABRICATED METAL	33	3
MACHINERY, EXC ELECTR.	29	2
ELECTRICAL MACHINERY	65	
MOTOR VEHICLES &EQUIP		
OTHER TRANSPORTATION	20	
MISCELLANEOUS MANUFAC	6	
OTHER DURABLE GOODS	29	
NOT SPECIFIED MANUFACT.		
TRANSP./COMMUN./PUB.UTILS		
RAILROADS	89	14
TRuCKING SERVICE	369	41
U.S. POSTAL SERVICE	160	6
OTHER TRANSPORTATION	1 101	88
COMMUNICATIONS	510	31
uTILITIES AND SANITARY	455	58
wHOLESALE TRADE	466	22
RETAIL TRADE:		
GENERAL MERCHANDISE	627	44
FOOD, BAKERY, AND DAIRY	560	20
AUTO DEALERS/GAS STATNS	556	11
EATING AND DRINKING	979	29
OTHER RETAIL TRADE	1024	52
FINANCE,INSUR,REAL ESTATE		
BANKING AND CREDIT	335	6
INSUR, REAL EST., FIN.	514	55

D IAPI R PLANNING AREA

BASELINE TABLE p.2
E(2)(a) EMPLOYMENT BY OCCUPATION

	TOTAL POPULATION	NATIVE POPULATION
SERVICES:		
BUSINESS SERVICES	592	31
REPAIR SERVICES	358	12
PRIVATE HOUSEHOLDS	87	25
OTHER PERSONAL SERVICES	725	77
ENTERTAINMENT AND RECR.	228	3
PROFESSIONAL & RELATED		
HOSPITALS	692	38
HEALTH SERVICES	568	30
SCHOOLS AND COLLEGES		
GOVERNMENT	154	16
PRIVATE	2998	266
(ITHER EDUC. SERV.	127	2
SOC.SERV/REL/MEMB ORG	476	29
LEGAL, ENGIN., PROF SVC	752	30
PUBLIC AOI41N1STRATION	3163	311
FEMALE:		
AGRICULTURE	87	2
FORESTRY AND FISHERIES	33	4
MINING	72	2
CONSTRUCTION	228	69
MANUFACTURING:		
NONDURABLE GOODS:		
FOOD AN(J KINDRED	20	
TEXTILE MILL PRODUCTS	4	4
APPAREL ANO OTHER	13	
PRINTINGs PUBLISHING,	74	
CHEMICALS AND ALLIED	8	
PAPER AND ALLIED PROD		
PETROLEUM AND COAL	15	6
OTHER NONDURABLE GOOD	24	7
DURABLE GOODS:		
FURNITURE, LUMBER, WOOE	7	
PRIMARY METAL INDUST.	13	
FABRICATED METAL	6	
MACHINERY, EXC ELECTR.	19	
ELECTRICAL MACHINERY	6	
MOTOR VEHICLES &EQUIP		
OTHER TRANSPORTATION	8	
MISCELLANEOUS MANUFAC	6	
OTHER OURABLE GOODS	13	
NOT SPECIFIED MANUFACT.		
TRANSP./COMMUN./PUB.UTILS		
RAILROADS	14	
TRUCKING SERVICE	55	10
U.S. POSTAL SERVICE	73	6
OTHER TRANSPORTATION	331	25
COMMUNICATIONS	142	6
UTILITIES AND SANITARY	65	5
WHOLESALE TRADE	158	13
RETAIL TRADE:		

VII-20

DIAPIR PLANNING AREA

BASELINE TABLE p.
E(2)(a) EMPLOYMENT BY OCCUPATION

	TOTAL POPULATION	NATIVE POPULATION
GENERAL MERCHANDISE	464	29
FOOD, BAKERY, AND DAIRY	291	10
AUTO DEALERS/GAS STATNS	158	
EATING AND DRINKING	621	21
OTHER RETAIL TRADE	587	22
FINANCE, INSUR, REAL ESTATE		
BANKING AND CREDIT	262	6
INSUR, REAL EST., FIN.	307	17
SERVICES:		
BUSINESS SERVICES	223	19
REPAIR SERVICES	29	
PRIVATE HOUSEHOLDS	81	25
OTHER PERSONAL SERVICES	503	61
ENTERTAINMENT AND RECR.	80	3
PROFESSIONAL & RELATED		
HOSPITALS	465	28
HEALTH SERVICES	415	30
SCHOOLS AND COLLEGES		
GOVERNMENT	76	15
PRIVATE	1677	162
OTHER EDUC. SERV.	112	2
SOC. SERV/REL/MEMB ORG	311	18
LEGAL, ENGIN., PROF SVC	361	14
PUBLIC ADMINISTRATION	1074	143

Hope Basin Planning Area
Native Employment

1. Baseline (Table E(2)(a)).

   a. Natives are found in mining and fisheries, as well as services,

   The baseline table for the Hope Basin Planning Area shows that Natives dominate some aspects of the employment picture, while in some occupations non-natives are more likely to be found. Specifically, natives dominate the mining and forestry and fisheries fields, as well as the services (except for professional services). Non-natives are found in greater numbers in construction, retail trade (especially in the eating and drinking classification, which as the table shows is dominated by females), professional services, and public administration.

   Since many of the native-dominated occupations are less well-paying than some of those that are not native-dominated, this may explain at least part of the difference in family incomes noted in Table E(l)(a). Native families were shown in that table to have lower incomes than those of the total families of native villages.

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BASELINE TABLE
E(2)(a) EMPLOYMENT BY OCCUPATION

HOPE BASIN PLANNING AREA

COUNT OF EMPLOYED PERSONS 16 YEARS ANO OVER BY SEX (2J BY INDUSTRY (49)	TOTAL POPULATION	NATIVE POPULATION
TOTAL:		
AGRICULTURE	5	3
FORESTRY AND FISHERIES	3	3
MINING	16	15
CONSTRUCTION	50	33
MANUFACTURING:		
NONDURABLE GOODS:		
FOOD ANO KINOREO	4	2
TEXTILE MILL PRODUCTS		
APPAREL AND OTHER		
PRINTING, PUBLISHING		
CHEMICALS AND ALLIED		
PAPER AND ALLIED PROO		
PETROLEUM AND COAL		
OTHER NONCURABLE GODO		
DURABLE GOODS:		
FURNITURE,LUMBER,WOOE	1	
PRIMARY METAL INDUST.		
FABRICATED METAL		
MACHINERY,EXC ELECTR.		
ELECTRICAL MACHINERY		
MOTOR VEHICLES &EQUIP		
OTHER TRANSPORTATION		
MISCELLANEOUS MANUFAC		
OTHER OURABLE GOODS		
NOT SPECIFIED MANUFACT.		
TRANSP./COMMUN./PUB.UTILS		
RAILROADS		
TRUCKING SERVICE	3	
u.S. POSTAL SERVICE	16	16
OTHER TRANSPORTATION	71	45
COMMUNICATIONS	20	14
UTILITIES AND SANITARY	34	29
WHOLESALE TRADE	2	
RETAIL TRADE:		
GENERAL MERCHANDISE	19	16

E(2)(a) EMPLOYMENT BY OCCUPATION

HOPE BASIN PLANNING AREA

	TOTAL POPULATION	NATIVE POPULATION
FOOD, BAKERY, AND DAIRY	24	21
AUTO DEALERS/GAS STATNS	2	2
EATING AND OR INKING	28	9
OTHER RETAIL TRADE	64	48
FINANCE, INSUR, REAL ESTATE		
BANKING AND CREDIT	9	3
INSUR, REAL EST., FIN.	6	6
SERVICES:		
BUSINESS SERVICES	6	6
REPAIR SERVICES	2	2
PRIVATE HOUSEHOLDS	2	2
OTHER PERSONAL SERVICES	40	32
ENTERTAINMENT ANO RECR.	10	10
PROFESSIONAL & RELATED		
HOSPITALS	48	30
HEALTH SERVICES	17	15
SCHOOLS ANO COLLEGES		
GOVERNMENT	13	10
PRIVATE	374	189
OTHER EDUC. SERV.	1	1
SOC. SERV/REL/MEMB ORG	55	42
LEGAL, ENGIN., PROF SVC	11	7
PUBLIC ADMINISTRATION	250	184
FEMALE:		
AGRICULTURE		
FORESTRY AND FISHERIES	3	3
MINING		
CONSTRUCTION	5	5
MANUFACTURING:		
NONDURABLE GOODS:		
FOOD ANO KINDRED	2	
TEXTILE MILL PRODUCTS		
APPAREL AND OTHER		
PRINTING, PUBLISHING,		
CHEMICALS AND ALLIED		
PAPER AND ALLIED PROD		
PETROLEUM ANO COAL		
OTHER NONDURABLE GOOD		
OURABLE GOODS:		
FURNITURE, LUMBER, WOOD	1	
PRIMARY METAL INDUST.		
FABRICATED METAL		
MACHINERY, EXC ELECTR.		
ELECTRICAL MACHINERY		
MOTOR VEHICLES & EQUIP		
OTHER TRANSPORTATION		
MISCELLANEOUS MANUFAC		
OTHER OURABLE GOODS		
NOT SPECIFIED MANUFACT.		
TRANSP./COMMUN./PUB. UTILS		
RAILROADS		

BASELINE TABLE p. 3
E(2)(a) EMPLOYMENT BY OCCUPATION

HOPE BASIN PLANNING AREA

	TOTAL Population	NATIVE POPULATION
TRUCKING SERVICE	3	
U.S. POSTAL SERVICE	14	14
OTHER TRANSPORTATION	l a	18
COMMUNICATIONS	12	10
UTILITIES AND SANITARY		
WHOLESALE TRADE		
RETAIL TRADE:		
GENERAL MERCHANDISE	6	6
FOOD, BAKERY, AND DAIRY	8	8
AUTO DEALERS/GAS STATNS	2	2
EATING AND DRINKING	24	9
OTHER RETAIL TRADE	22	19
FINANCE, INSUR, REAL ESTATE		
BANKING AND CREDIT	6	
INSUR, REAL EST., FIN.	3	3
SERVICES:		
BUSINESS SERVICES	2	2
REPAIR SERVICES		
PRIVATE HOUSEHOLDS	2	2
OTHER PERSONAL SERVICES	25	18
ENTERTAINMENT AND RECR.	7	7
PROFESSIONAL & RELATED		
HOSPITALS	31	21
HEALTH SERVICES	15	13
SCHOOLS AND COLLEGES		
GOVERNMENT	5	5
PRIVATE	227	135
OTHER EDUC. SERV.	1	1
SOC.SERV/REL/MEMB ORG	46	35
LEGAL, ENGIN., PROF SVC	6	6
PUBLIC ADMINISTRATION	105	95

TAB VIII

RECREATION, TOURISM, AND AESTHETICS

RECREATION AND TOURISM EFFECTS TABLES

Introduction

The purpose of the OCS-related effects information in this section is to estimate the costs resulting from impacts of OCS-related activities on tourism and recreation in each Planning Area. This requirement, while necessitated by MMS in order to weigh the social costs/impacts of OCS leases among all Planning Areas, significantly. curtails the information which can be presented in our report because of the lack of recreation and tourism data on a Planning Area basis.

The potential impacts of OCS-related operations may be significant on both water-dependent and water-enhanced recreation and tourism activities. Because tourism and recreation depend on many sectors of the economy, which comprise most of the service sector and retail trade, impacts of OCS activities may be critical to the local economy. Induced secondary impacts in terms of sales and employment may also be significant.

The impacts related to OCS activities are wide-ranging. They include oil spills, visual/aesthetic interference by OCS-related structures, and the physical presence of OCS-related structures in on-shore and off-shore areas. Closure of certain areas to tourist and recreation activity may result from OCS-related activities and vessel traffic.

In the past, numerous tourism and recreation studies have been undertaken to analyze these activities within the context of the local economy. The studies have produced thorough and insightful analyses on quantitative impacts of OCS-related activities, The main problem with many of these studies, from the viewpoint of the present research effort, is that almost all cover a limited geographic area. And, there is no uniform set of definitions or standard terms of reference for the tourism/recreation sector. The measures of impacts differ among the local studies both conceptually and theoretically. This renders all of the local studies nearly useless for our purposes because the inputs and results therein cannot be added to regional, state or Planning Area levels. We must either derive our own data for the effects tables on the Planning Area level from the analyses of selected OCS activity variables, or use the scarce uniform effects information on OCS-related activities, which is available from the Environmental Impact Statements (EIS's).

We have, therefore, resorted to the information available in the pertinent EIS's. Unfortunately, the required information from the EIS's covers only seven Planning Areas, those along the Atlantic coast, the Gulf of Mexico and the Pacific coast. We do not have tourism and recreation effects data for the Planning Areas in Alaska and for the states of Washington and Oregon.

Losses to the recreation areas in the following tables are expressed monetarily in terms of gross revenues for various goods and services sectors and purchased by participants in recreation activities and/or tourists. The figures represent worst case assumptions. However, the losses, shown are for a specific subarea(s) within a Planning Area. If losses in gross revenues in recreation and tourist activities occur in other subarea(s) within the same Planning Area, it is likely that they will be offset by gains in gross revenues in another subarea within the same Planning Area or in another Planning Area altogether.

The following information is presented for the seven Planning Areas.

- <u>Annual loss of tourism and recreation generated dollars due to OCS activities.</u> This information has been obtained directly from the EIS's.
- <u>Total loss of tourism and recreation generated dollars.</u> This data was obtained by multiplying the annual loss by the projected lifespan of OCS activities.

- Average tourism and recreation dollars lost per barrel of oil spilled. This value was obtained by dividing the total dollars lost in the tourism and recreation sector by the estimate of total oil spills (from Table B-3b).

- Average tourism and recreation generated dollars lost per B.O.E. of mean hydrocarbon resource estimates. These estimates were obtained by dividing the total loss in the tourism and recreation sector by the mean hydrocarbon resource estimates.

TAB IX

SOCIOECONOMIC INFRASTRUCTURE

1. Effects (Table G(1) (b)) Personal Income

a. <u>Total personal income may increase by about $1,996,920,000 as a result of the proposed OCS oil- and gas-related activities associated with the 1984 lease offering in the Diapir Field Planning Area</u>

It is estimated that about 49,923 new and local resident employment years may be generated during the period 1985 through 2010 as a result of the demand for jobs generated by OCS oil- and gas-related activities. When multiplied times the average annual salary of direct and indirect oil and gas employees, estimated at about $40,000, the net effect may be an increase of $1,996,920,000 in total personal income. Peak personal income may occur in 1997 at $185,080,000.

Employment, population and community infrastructure impacts resulting from OCS oil- and gas-related activities in the Diapir Planning Area may also affect the Anchorage Census area, the South Central Alaska region, and Fairbanks Census area. The distribution of effects is estimated to be about 67.2%, 15.1% and 17.6%, respectively. Note for MMS planning purposes, the Fairbanks North Star region is considered part of the Diapir Field Planning Area. It should also be noted that there may be partially sustaining effects on the communities. That is, there may be excess capacity in some effects measures which may not require additional new units to be introduced. For example, the labor force may have excess capacity to sustain the demand for labor generated by OCS oil- and gas-related activities which may result from the lease sale.

b. <u>Dollar effects may be about $.665 per barrel of oil equivalent</u>

Based on projected production of about 3,000 million barrels of oil equivalent over the project life of the lease sale, the dollar effects of the increase in total personal income may be about $.665 per barrel of oil equivalent.

c. <u>Summary</u>

The net effect of the increase in total personal income resulting from OCS oil- and gas-related activity in the Diapir Planning Area may be about $1,996,920,000 or .665 per barrel of oil equivalent over the project life of the lease sale.

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2290c

Table G(1) (b): BASIC DEMOGRAPHIC INDICATORS

DIAPIR FIELD PLANNING AREA

Effects Measures	(1) Dollars Equivalent of Effects Measure Change (+/-)	(2) Production (BOE)	(3) Effects per (BOE) (1) - (2) = 3	(4) Remarks
(1) Total Personal Income	$1,996,920,000[a]	3000mm	.665	67.2%, 15.1% and 17.6% of the effect will be felt by the Anchorage Census area, the South Central Alaska region and the Fairbanks Census area, respectively.

a/ Estimate is based on the number of new and local resident employment years (49,923) over the life of the project from 1985 through 2010 times an annual salary of $40,000.[2] Peak personal income in 1997 is $185,080,000.

Sources:

1/ FEIS Proposed Diapir Field Lease Offering, June 1984, (3/84 EIS).
2/ Executive Resource Associates estimate.

2264C

Diapir Field Planning Area

1. Effects (Table G(2)(b)) Health Capability

a. The number of hospital beds needed is estimated to increase by fifty-one (51), and the number of physican service years needed is estimated to increase by 106 between 1985 and 2010 as a result of OCS oil- and gas-related activity associated with a 1984 lease sale in the Diapir Planning Area.

The extent of economic activity and change for these two health care resources is estimated to be $8,890,473 for hospital beds and $9,847,400 for physician services in the Diapir Field Planning Area over the twenty-five (25) year project life of the lease sale (1985 - 2010). The average cost of a staffed and equipped bed in the Planning Area is $174,323, and the average annual net income of a physician is $92,900. Additional physician need will peak in 1997, at approximately ten physicians.

b. Dollar effects are estimated at $.0029633 for hospital beds and $.0328 for physician services (total = $.0357633) per barrel of oil equivalent.

Projected production is estimated at 3.000 million barrels of oil equivalent in the Diapir Field Planning Area.

c. Summary

Additional associated expenses and/or revenue for these two major health care resources are estimated to total $18,737,873, or by about $.0357633 per barrel of oil equivalent as a result of OCS oil- and gas-related activity in the Diapir Field Planning Area.

2289c

EFFECTS TABLE

Health Sector

Table G(2)(b): HEALTH CAPACITY STATISTICS

DIAPIR FIELD PLANNING AREA

Effects Measures	(1) Dollars Equivalent of Effects Measure Change (+/-)	(2) Production (BOE)	(3) Effects per BOE (1) ÷ (2) = 3	(4) Remarks
(1) Number of Hospitals				
(2) Number of Beds	$8,890,473	Production (BOE) 3,000 mm	.0029633	
(3) Admissions				
(4) Census				
(5) ER Visits				
(6) Number of Physicians				
(7) Number of Dentists	$9,847,400	$9,847,400	.0328	

a/ Estimate is based on 3.5 beds per 1,000 residents in the peak Year. The resulting number is multiplied by the average cost of a staffed hospital bed ($174,323) in the planning area.

b/ Estimate is based on 1 physician for 1,500 residents. The 1982 average annual income per physician ($92,000)3/ is multiplied by the number of physician years over the project life (106).4/ Additional physicians demand peaks in (1997) at 10.

Sources:

1/ Alaska OCS T.R., No. 46, Vol. 2, BLM, 1980, p., American Hospital Association estimate.
2/ Executive Resource Associates eStimate.
3/ AMA, personal communication.
4/ 3/84, EIS.

2295c

EFFECTS TABLE

Health Sector

Table G(3)(b): **SOCIO-ECONOMIC** IMPACT TABLE

Effects Measures	(1) Dollars Equivalent of Effects Measure Change **(+/-)**	(2) Production **(BOE)**	(3) Barrels of oil Equivalent (1) (2) = 3	(4) Remarks
Number of Motor Vehicle Accidents **(MVAS)**				
Number of Driving While Intoxicated **(DWI)** Arrests				
Number of Divorces				
Number of Aid to Families with Dependent Children **(AFDC)** Recipients				
Number of Medicaid Recipients				

[a] No secondary source was found that related these health effects to OCS activity by planning area.

SOURCES:

2318c

EFFECTS TABLE

Health Sector

Table G(4)(b): EPIDEMIOLOGICAL MEASURES

Effects Measures	(1) Dollars Equivalent of Effects Measure Change (+/-)	(2) Production (BOE)	(3) Barrels of oil Equivalent (1) (2) = 3	(4) Remarks
Number of Homicides				
Number of Suicides				
Drug Abuse Prevalence				
Leading Causes of Death	(CAUSE)			
(1)				
(2)				
(3)				
(4)				
(5)				
Leading Causes of Morbidity	(Cause)			
(1)				
(2)				
(3)				
(4)				
(5)				

2319c

EFFECTS TABLE

Health Sector

Table G(4)(b): EPIDEMIOLOGICAL MEASURES (Continued)

Effects Measures	(1) Dollars Equivalent of Effects Measure Change (+/-)	(2) Production (BOE)	(3) Barrels of oil Equivalent (1) (2) = 3	(4) Remarks
Sexually Transmitted Disease (STD) Incidence				
Number of Births				
Number of Deaths				
Number of Perinatal Deaths				

[a] No secondary source was found that related epidemiological measures to OCS activity by planning area.

SOURCES:

2319c

EFFECTS TABLE

Table G(5)(b): NUMBER OF CHURCHES, MEMBERSHIPS AND DONATIONS

Effects Measures	(1) Dollars Equivalent of Effects Measure Change (+/-)	(2) Production (BOE)	(3) Barrels of oil Equivalent (1) (2) = 3	(4) Remarks
(1) Number of Churches Times Average Annual Donations				

[a] There are *no* secondary data sources that provide discussions or analysis of the above effects measures.

SOURCES:

2320c

EFFECTS TABLE

Table G(6)(b): EMPLOYMENT/UNEMPLOYMENT BY OCCUPATION

Effects Measures	(1) Dollars Equivalent of Effects Measure Change (+/-)	(2) Production (BOE)	(3) Barrels of oil Equivalent (1) - (2) = 3	(4) Remarks

[a] No secondary source was found that related unemployment projections to OCS activity. Related income and employment gains are presented on Table G(l)(b).

SOURCES:

2321c

Alaska: **Diapir** Field Planning Area

Introduction. For purposes of this study, the land mass associated with the Diapir Field Planning Area includes the entire North Slope Borough, (although part of the borough is contiguous with the Barrow Arch Planning Area) **all** of the upper Yukon and part of the **Yukon-Koyukuk** Census areas and the Fairbanks-North Star region. However, an overwhelming percentage of the baseline population and employment is associated with the North Slope Borough and Fairbanks-North Star area. The resident population in the North Slope Borough is primarily **Inupiat** (i.e. Inupiaq-speaking Eskimo) where the population in the Fairbanks North Star area is generally non-native. As a relatively undeveloped rural area, the North Slope Borough has intensively felt the direct impacts of **oil** development and associated infrastructure. The Fairbanks-North Star area, which has served as a major staging ground for the Prudhoe Bay discovery and the **Trans-Alaskan** Pipeline System (TAPS) construction, has been impacted significantly but not as dramatically as the more rural North Slope Borough.

Population. The population of the planning area in 1970 was 49,327, increasing to 58,182 in 1980.

The planning area is composed of both Alaskan natives and non-natives. Between 1970 and 1980, the increase in native and non-native populations was 35 percent and 15 percent, respectively. Also, both groups, but especially the natives, seem to be aging.

Between 1970 and 1980, average household size declined from 4.07 to 3.03 persons per household, respectively. This shift reflects an increase in per capita income, aggressive housing construction programs and to a lesser extent, a decline in the number of native extended family households.

Multi-household functional units have increasingly replaced single family household units. Female headed households increased from 4 percent in 1970 to 9 percent in 1980. In part, this reflects increased employment possibilities for females, providing them the opportunity to establish functioning households in the absence of males. Additionally, single-person households increased from 12 percent in 1970 to 22 percent in 1980, a trend common in other planning areas.

Employment. Both North Slope Borough and Fairbanks-North Star area employment is significantly affected directly or indirectly by oil development. The North Slope Borough employs a high number of its permanent residents in oil revenue funded government services, although a significant, but decreasing number of residents are employed by fishing activities. The Borough has unique employment policies which permit employees flexibility in work schedules to accommodate a continuation of traditional **Inupiat** resource harvest activities and other aspects of Inupiat life. The majority of the oil and related construction workers are non-residents.

The Fairbanks-North Star area's employment base is relatively broad. Fairbanks is a trade, transportation, and government center for the northern half of Alaska, and is second only to Anchorage in numbers of jobs. However, the Fairbanks-North Star area will continue to serve as the major staging ground and labor market for all future oil and gas activities which occur offshore from Alaska's North Slope.

Per capita income increased from $3,895 in 1970 to $9,800 in 1980. In 1980, the average income per person in the North Slope Borough and the Fairbanks-North Star area was 65 percent and 40 percent higher than the average U.S. resident, respectively. However, this figure is misleading without looking at the high cost of living in both of these areas. Adjusted for inflation, the North Slope Borough was 23 percent below the national average and the Fairbanks-North Star area was only 3 percent above the national average per capita income.

Education. As in other planning areas, the number of individuals in elementary grades has increased from 14,261 in 1970 to 16,753 in 1980. In all planning areas, accurate data on the percentage of individuals completing post-secondary education were not compiled, but enrollment in post-secondary educational institutions increased. Through property taxes based on petroleum industry facilities at the Prudhoe Bay enclave, the North Slope Borough has been able to actively promote and support more available and high quality formal education. In addition, the borough has also promoted Inupiaq literacy and the inclusion of traditional Inupiat values, skills, and knowledge in the formal educational setting. Fairbanks is the location of the main campus of the University of Alaska and is very supportive of educational programs as well.

Housing. Between 1970 and 1980 the total number of year-round housing units increased from 13,151 to 22,866, respectively. This is one of the largest percentage of increase in the number of year-round housing units of all planning areas in the State of Alaska. Under the auspices of the North Slope Borough, new housing construction has been a major priority. This construction has also provided several jobs for North Slope residents. However, despite the active construction program, there have continued to be housing shortages in larger communities such as Barrow. The Fairbanks-North Star area significantly expanded and diversified it's housing stock during the 1970's. Although, this area probably needs to continue to develop it's non-oil related employment base to offset the typical boom bust housing effect of oil development activities such as Prudhoe Bay and TAPS.

Health. Significant differences exist between the North Slope and Fairbanks in the number and capabilities of health and medical care facilities. There is one hospital located in Barrow serving the North Slope Borough. Long-term, specialized, or critical care cases are referred to urban medical facilities, such as those in Fairbanks or Anchorage. However, the use of local oil revenues for health care facilities will probably improve the future situation. Although, the health care facilities in Fairbanks are not as extensive as those in Anchorage, they do serve local demand in most cases.

Other. There were inadequate data compiled for this study to comment on the **social** and mental health of the residents of the planning area.

The number of churches has increased from 9 in 1970 to 15 in 1980, with a corresponding decrease in church membership. If these data are accurate, a partial explanation of decreasing membership may be a combination of a growing lack of interest in church going and an inability to account for a significant percentage of church going people who are not formal members.

TABLEG(1)(A): BASIC DEMOGRAPHIC INDICATORS

PLANNING AREA:DIAPIR
COUNTY/STATE : ALL COUNTIES

ACTIVITY MEASURES	HISTORICAL YEAR(1970)	BASELINE YEAR(1980)	OATA SOURCES	REMARKS
1. POPULATION				
A) TOTAL PERSONS	49327	58182		
B) PERS PER SQUARE MILE	0.5	0.6		
C) URBAN POPULATION	33534	31920		
D) AGE DISTRIBUTION(%)				
UNDER 5 YEARS	10.4	10.1		
5 TO 17 YEARS	25.5	21.2		
18 TO 64 YEARS	62.3	66.3		
65 YEARS AND OVER	1.8	2.4		
MEDIAN AGE	22.4	25.7		
E) RACE,ETHNIC ORIGIN				
WHITE	41824	47241		
BLACK	2545	3053		
NATIVE AMERICANS	4624	6251		
ASIAN-AMERICANS	279	919		
HISPANIC ORIGIN(FOOTNOTE1)	1252	1529		
2. HOUSEHOLDS				
A) TOTAL	12112	19204		
B) PERSONS PER HOUSEHOLD	4.07	3.03		
C) FAMILY				
TOTAL	10455	13764		
MARRIED COUPLES(FOOTNOTE 2)	11539	11821		
FEMALE HHOLDER,NO SPOUSE PRSNT	413	1287		
D) NON-FAMILY HOUSEHOLDS				
TOTAL	1777	5440		
ONE-PERSON	1432	4225		
3. PER CAPITA INCOME	3895	9900		

1. HISPANIC ORIGIN: 1980 DEFINITION BASED ON SELF-IDENTIFICATION OF SPANISH ORIGIN OR DESCENT; 1970 DEFINITION VARIED BY STATE BASED ON LANGUAGE, SURNAME, OR PUERTO RICAN STOCK.
2. FOR 1970 BASED ON COUNT OF NOW-MARRIED, EXCLUDING SEPARATED, MALES.

TABLE G(1)(A): BASIC DEMOGRAPHIC INDICATORS

PLANNING AREA: DIAPIR
COUNTY/STATE : ALL COUNTIES

ACTIVITY MEASURES	HISTORICAL YEAR(1970)	BASELINE YEAR(1980)	DATA SOURCES	REMARKS
4. HOUSING				
A) TOTAL UNITS	13151	23866		
B) YEAR-ROUND HOUSING UNITS				
TOTAL UNITS	13067	23244		
PCT IN 1-UNIT STRUCTURES	40.0	48.1		
PCT IN 5-UNIT UP STRUCTURES	35.5	30.4		
C) PCT UNITS BY YEAR STRUCTURE BUILT				
1970 TO 1980	NOT APPLICABLE	49.2		
1960 TO 1969	37.1	20.8		
1939 OR EARLIER	8.8	3.5		
D) OCCUPIED UNITS				
TOTAL	12084	19204		
LACKING COMPLETE PLUMBING	1163	2323		
WITH > 1.00 PERSONS/ROOM	2324	1771		
HOUSE HEATING FUEL PCTS				
GAS	6.2	5.3		
ELECTRICITY	5.1	11.6		
FUEL OIL,KEROSENE	48.5	60.8		
PCT OWNER OCCUPIED	34.7	51.1		
MEDIAN MONTHLY COSTS(FOOTNOTE 1)	NOT AVAILABLE	641		
MEDIAN VALUE(FOOTNOTE 2)	15392	65069		
RENTER OCCUPIED UNITS	7162	9399		
MEDIAN GROSS RENT(FOOTNOTE 3)	201	354		
5. JOURNEY TO WORK				
EMPLOYMENT/RESIDENTS(FOOTNOTE 4)	NOT AVAILABLE	1.065		
MEANS OF TRANSPORTATION:				
TOTAL EMPL CIVILIAN LAB FORCE	NOT APPLICABLE	26759		
PCT DRIVE ALONE (FOOTNOTE 5)	NOT AVAILABLE	51.2		
PCT CAR POOL (FOOTNOTE 5)	NOT AVAILABLE	21.6		
PCT PUBLIC TRANSIT(FOOTNOTE 5)	NOT AVAILABLE	3.9		
6. EDUCATION				
A) SCHOOL ENROLLMENT(FOOTNOTE 6)				
TOTAL,ALL YEARS	14261	16753		
ELEMENTARY AND KINDERGARTEN				
TOTAL	9395	8538		
PCT PRIVATE	3.6	3.7		
COLLEGE	2071	4360		
B) YEARS OF SCHOOL COMPLETED				
PERSONS 25 YEARS OLD AND UP	20239	30130		
PCT WITH 12 YRS OR MORE	71.3	84.5		
PCT WITH 16 YRS OR MORE	15.8	21.3		

1. 1980 FOR SELECTED NON-CONDOMINIUM UNITS WITH MORTGAGE.
2. FOR SPECIFIED OWNER-OCCUPIED NON-CONDOMINIUM UNITS.
3. SPECIFIED RENTER-OCCUPIED HOUSING UNITS PAYING CASH RENT, 1970 AND 1980.
4. WORKERS WORKING IN COUNTY OJV1OEJ) BY WORKERS RESIDING IN COUNTY(BASED ON WORKERS REPORTING PLACE OF WORK).
5. BASED ON WORKERS REPORTING MEANS OF TRANSPORTATION TO WORK, 1980. NOT AVAILABLE FOR 1970 FROM SOURCE FILE.
6. POPULATION 3 TO 34 IN 1970.

H-1

BASELINE TABLE

Table G(2)(a): HEALTH CAPACITY STATISTICS

Diapir PLANNING AREA

Measures	Historical Year (1978) Units	Baseline Year (1983) Units	Forecast Year (1988) Units	Data Source	Remarks
(1) NUMBEROF HOSPITALS[a/]		1		AHA	A, below
(2) NUMBEROF BEDS		14		AHA	A, below
(3) ADMISSIONS		617[c/]		AHA	A, below
(4) CENSUS[b/]		5[c/]		AHA	A, below
(5) OCCUPANCY		35.7			
(6) EMERGENCY ROOM (ER) VISITS				AHA	B, below
(7) NO. OF PHYSICIANS				CCDB	C, below
(8) NO. OF DENTISTS				CCDB	D, below

a/ Includes all 22 types of hospitals (by service) as reported in the AHA Guide To The Health Care Field. 1978 and 1983 Editions.

b/ Average number of inpatients receiving care each day during a 12-month period.

c/ O hospitals did not report this data. as reported in the AHA Guide To The Health Care

AHA SOURCE: AMERICAN HOSPITAL ASSOCIATION (AHA) GUIDE TO THE HEALTH CARE FIELD, 1978 and 1983 EDITIONS.

CCDB SOURCE: COUNTY AND CITY DATA BOOK, 1983.

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<u>BASELINE TABLE</u>

HEALTH SECTOR

Table G(3)(a): SOCIO-ECONOMIC STATISTICS

Diapir PLANNING AREA

Measures/ Indices	Historical Year (1979) Units	Baseline Year (1980) Units	Forecast Year (1988) Units	Data Source(s)	Comments
Number of Motor Vehicles Accidents (MVAs)					
Number of Driving while Intoxicated (DWI) Arrests					
Number of divorces		11			
Number of Aid to Families with Dependent Children (AFDC) Recipients					
Medicare					
Hospitals					
Persons enrolled		150			
Benefit payments ($ millions)		.1			
Medical					
Persons enrolled		93			
Benefit payments ($ millions)		*Z			

* Less than $50,000

Source: County and City Data Book 1983, Bureau of the Census.

0966R

BASELINE TABLE

HEALTH SECTOR

Table G(4) (a): EPIDEMIOLOGICAL MEASURES

Diapir PLANNING AREA

Measures/ Indices	Historical Year (1979) Units	Baseline Year (1981) Units	Forecast Year (1988) Units	Data Source(s)	Comments
Number of Serious Crimes		579			
Property		501			
Violent		78			
Drug Abuse Prevalence					
Leading Causes of Death	(Cause)	(Cause)	(Cause)		
(1)					
(2)					
Leading Causes of Morbidity	(Cause)	(Cause)	(Cause)		
(1)					
(2)					
Sexually Transmitted Disease (STP) Incidence					
Number of Births		N/A			
Number of Deaths		20			
Number of Perinatal Deaths					

Source: County and City Data Book 1983, Bureau of the Census.

BASELINE TABLE

Table G(5)(a): NUMBER OF CHURCHES **AND MEMBERSHIP**

Diapir PLANNING AREA

Activity Measures	Historical Year (1971)	Baseline Year (1980)	Forecast Year	Data Sources	Remarks
(1) CHURCHES	9	15			
(2) MEMBERSHIP COUNT	1,276	1,001			
(3) AVERAGE DONATIONS PER MAJOR SECT					
CATHOLIC					
PROTESTANT					
JEwISH					

Source: Quinn, Bernard, et. al, Churches and Church Membership in the United States 1980, (also same title for 1971).

0977R

BASELINE TABLE

Table G(6) (a) : UNEMPLOYMENT DATA

Diapir PLANNING AREA

Activity Measures	Historical Year	Baseline Year (1982)	Forecast Year	Data Sources	Remarks
TOTAL LABOR FORCE		2,621			
TOTAL UNEMPLOYED		204			
RATE OF UNEMPLOYMENT		7.8			

Source: County and City Data Book 1983, Bureau of the Census.

Alaska: Hope Basin Planning Area

Introduction. Land masses associated with the Hope Basin Planning Area include the Alaska coastal regions of the Chukchi Sea and Kotzebue Sound from immediately southeast of Point Hope in the north to Shishmauf and Cape Prince of Wales to the south. The community of Wales is statistically included in the Norton Basis Planning Area.

This planning area is occupied primarily by Inupiat, who have had a long-term relationship with the region. Communities range in size from Kotzebue, regional center of the area, with a population in excess of 2,000, to smaller communities like Deering and Buchland with populations of less than 300 individuals. Residents of this planning area depend heavily on marine and riverine resources and the western arctic caribou herd economically culturally, and nutritionally. Kotzebue, headquarters of NANA (Northwest Alaska Native Association), is the political, social, and economic service center of the area.

Population. The 1970 population of this planning area was 4,127 individuals, increasing to 4,831 in 1980. This is an increase of 17.0 percent over the decade. The Inupiat residents composed 87.1 percent (3,580 individuals) of the population in 1970 and 84.8 percent (4,120) in 1980. As these statistics suggest, there has been no major influx of non-natives to this planning area over the past decade. It is an expressed goal of the regional native corporation, NANA, to maintain cultural integrity, unity, and self sufficiency of Inupiat people in this planning area. NANA has used its economic leverage to work towards this goal. The trend towards an increased median age of the population is present in this region as it was in other planning areas.

Household size declined from 5.7 in 1970 to 4.2 in 1980, a trend associated with modern housing projects and the dissolution of extended family households. As in other rural areas, if household size statistics were available by community, Kotzebue as regional center would have the smallest household size. As described for the Diapir Field Planning ARea, multihousehold units commonly function in economic and social spheres of activity. The number of single individual households increased from 80 in 1970 to 199 in 1980, or from 11.0 percent of total households to 17.5 percent. Female headed households increased from 11.4 percent in 1970 to 15.11 percent in 1980, a trend identified in all other planning areas.

Employment. In 1982 the labor force was 3,074, of whom 293 or 9.5 percent were unemployed. As in other rural areas of the state, the smaller communities have few full-time positions and residents derive cash incomes from seasonal and part-time wage labor within and without their home communities, reindeer herding, commercial fishing, trapping, the production of arts and crafts, and transfer payments. The greatest number of wage employment opportunities exist in Kotzibue. NANA may be the largest employer in the private sector, although the regional school district and health care system are significant employers in Kotzibue and smaller communities. NANA is currently seeking means of providing more regional employment opportunities for residents (e.g. the Red Dog Mine development plan). NANA has contracted with private industry to provide services for north slope oil production, but the number of regional residents employed in these capacities was not documented for this study.

Per capita income increased from $1,515 in 1970 to $5,175 in 1980, a 241.6 percent increase over the decade. Both absolute incomes for both time periods and percentage of increase over the decade are significantly lower in the Hope Basin Planning Area than in the North Slope Borough despite their contiguous geographic location and similarly high cost of living.

Education. As in all planning areas, there has been a decline in elementary school enrollment and an increase in the number of individuals attending post-secondary educational institutions. As in other rural areas of the state, over the past decade high schools have been constructed and staffed in nearly all communities, and the regionalization of school district control has resulted in increased emphasis on Inupiaq literacy and culture in school curriculum and more local input into the educational process.

Housing. The number of year-round housing units increased from 838 in 1970 to 1,332 in 1980, an increase of 58.9 percent. Unilike the Gulf of Alaska and Cook Inlet Planning Areas in which there was a reduction in the percentage of renter occupied units over the 1970 to 1980 decade, as in the Diapir Field Planning Area, there has been an increase in renter occupied units in this region. It is expected that the majority of this increase occurred in Kotzebue, although statistics were not documented by community for this study.

Health. There is a single U.S. Public Service Hospital in Kotzebue, serving the residents of this region, although the number of physicians was not documented for this study (there were four dentists in 1983 according to health statistics). As in other rural areas, this is a regional hospital, and long-term, critical, or specialized care cases are normally transferred to Anchorage. Village medical care is generally provided by para-professionals who are in radio contact with hospital physicians and nurses in Kotzebue.

Other. There were inadequate data documented for purposes of this study to comment on mental and social health conditions in the planning area. The number of churches in the region increased

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from 16 to 17 between 1970 and 1980, but the number of members declined from 2,695 to 2,621 over the same time period. The denomination Society of Friends, commonly referred to as Quakers, dominates the region in terms of membership and influence.

1014R

TABLE G(1)(A): BASIC DEMOGRAPHIC INDICATORS

PLANNING AREA: HOPE
COUNTY/STATE : ALL COUNTIES

ACTIVITY MEASURES	HISTORICAL YEAR(1970)	BASELINE YEAR(1980)	DATA SOURCES	REMARKS
1. POPULATION				
A) TOTAL PERSONS	4127	4831		
B) PERS PER SQUARE MILE	0.1	0.2		
C) URBAN POPULATION	0	0		
D) AGE DISTRIBUTION(%)				
UNDER 5 YEARS	13.6	11.8		
5 TO 17 YEARS	41.0	30.1		
18 TO 64 YEARS	41.0	53.0		
65 YEARS AND OVER	4.4	5.2		
MEDIAN AGE	16.0	21.6		
E) RACE,ETHNIC ORIGIN				
WHITE	510	696		
BLACK	18	5		
NATIVE AMERICANS	3580	4120		
ASIAN-AMERICANS	0	4		
HISPANIC ORIGIN(FOOTNOTE 1)	0	31		
2. HOUSEHOLDS				
A) TOTAL	725	1140		
B) PERSONS PER HOUSEHOLD	5.69	4.24		
C) FAMILY				
TOTAL	650	882		
MARRIED COUPLES(FOOTNOTE 2)	595	640		
FEMALE HHOLDER,NO SPOUSE PRSNT	83	173		
D) NON-FAMILY HOUSEHOLDS				
TOTAL	92	258		
ONE-PERSON	80	199		
3. PER CAPITA INCOME	1515	5175		

1. HISPANIC ORIGIN: 1980 DEFINITION BASED ON SELF-IDENTIFICATION OF SPANISH ORIGIN OR DESCENT: 1970 DEFINITION VARIED BY STATE BASED ON LANGUAGE, SURNAME, OR PUERTO RICAN STOCK.
2. FOR 1970 BASED ON COUNT OF NOW-MARRIED, EXCLUDING SEPARATED, MALES.

TABLE G(1)(A): BASIC DEMOGRAPHIC INDICATORS

PLANNING AREA: HOP F
COUNTY/STATE : AIL COUNTIES

ACTIVITY MEASURES	HISTORICAL YEAR(1970)	BASELINE YEAR(1980)	OAT A SOURCES	REMARKS
4. HOUSING				
A) TOTAL UNITS	919	1486		
B) YEAR-ROUND HOUSING UNITS				
TOTAL UNITS	838	1332		
PCT IN 1-UNIT STRUCTURES	77.0	77.7		
PCT IN 5-UNIT UP STRUCTURES	8.4	11.1		
C) PCT UNITS BY YEAR STRUCTURE BUILT				
1970 TO 1980	NOT APPLICABLE	52.6		
1960 TO 1969	38.2	23.1		
1939 OR EARLIER	16.1	4.5		
O) OCCUPIED UNITS				
TOTAL	702	1140		
LACKING COMPLETE PLUMBING	614	537		
WITH > 1.00 PERSONS/ROOM	471	573		
HOUSE HEATING FUEL PCTS				
GAS	0.0	1-6		
ELECTRICITY	0.0	2.9		
FUEL OIL,KEROSENE	24.7	84.6		
PCT OWNER OCCUPIED	49.6	61.2		
MEDIAN MONTHLY COSTS(FOOTNOTE 1)	NOT AVAILABLE	274		
MEDIAN VALUE(FOOTNOTE 2)	4315	35817		
RENTER OCCUPIED UNITS	206	442		
MEDIAN GROSS RENT(FOOTNOTE 3)	66	455		
5. JOURNEY TO WORK				
EMPLOYMENT/RESIDENTS(FOOTNOTE 4)	NOT AVAILABLE	0.829		
MEANS OF TRANSPORTATION:				
TOTAL EMPL CIVILIAN LAB FORCE	NOT APPLICABLE	1213		
PCT DRIVE ALONE (FOOTNOTE 5)	NOT AVAILABLE	3.7		
PCT CAR POOL (FOOTNOTE 5)	NOT AVAILABLE	6.9		
PCT PUBLIC TRANSIT(FOOTNOTE 5)	NOT AVAILABLE	0.2		
6. EDUCATION				
A) SCHOOL ENROLLMENT (FOOTNOTE 6)				
TOTAL,ALL YEARS	1720	1664		
ELEMENTARY AND KINDERGARTEN				
TOTAL	1278	968		
PCT PRIVATE	10.3	6.9		
COLLEGE	11	73		
B) YEARS OF SCHOOL COMPLETED				
PERSONS 25 YEARS OLD ANO UP	1490	2077		
PCT WITH 17 YRS OR MORE	24.6	48.2		
PCT WITH 16 YRS OR MORE	5.6	13.4		

1. 1980 FOR SELECTED NON-CONDOMINIUM UNITS WITH MORTGAGE.
7. FOR SPECIFIED OWNER-OCCUPIED NON-CONDOMINIUM UNITS.
3. SPECIFIED RENTER-OCCUPIED HOUSING UNITS PAYING CASH RENT, 1970 ANO 1980.
4. WORKERS WORKING IN COUNTY DIVIDED BY WORKERS RESIDING IN COUNTY(BASED ON WORKERS REPORTING PLACE OF WORK).
5. BASED ON WORKERS REPORTING MEANS OF TRANSPORTATION TO WORK,1980. NOT AVAILABLE FOR 1970 FROM SOURCE FILE.
6. POPULATION 3 TO 34 IN 1970.

BASELINE TABLE

Table G(2)(a): HEALTH CAPACITY STATISTICS

Hope PLANNING AREA

Measures	Historical Year (1978) Units	Baseline Year (1983) Units	Forecast Year (1988) Units	Data Source	Remarks
(1) NUMBER OF HOSPITALS[a/]		1		AHA	A, below
(2) NUMBER OF BEDS		31		AHA	A, below
(3) ADMISSIONS		788[c/]		AHA	A , below
(4) CENSUS[b/]		8[c/]		AHA	A, below
(5) OCCUPANCY		25.8			
(6) EMERGENCY ROOM (ER) VISITS				AHA	B, below
(7) NO. OF PHYSICIANS				CCDB	C, below
(8) NO. OF DENTISTS		4		CCDB	D, below

a/ Includes all 22 types of hospitals (by service) as reported in the AHA Guide To The Health Care Field, 1978 and 1983 Editions.

b/ Average number of inpatients receiving care each day during a 12-month period.

c/ O hospitals did not report this data.
as reported in the AHA Guide To The Health Care

AHA SOURCE: AMERICAN HOSPITAL ASSOCIATION (AHA) GUIDE TO THE HEALTH CARE FIELD, 1978 and 1983 EDITIONS.

CCDB SOURCE: COUNTY AND CITY DATA BOOK, 1983.

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BASELINE TABLE

HEALTH SECTOR

Table G(3)(a): SOCIO-ECONOMIC STATISTICS

Hope PLANNING AREA

Measures/ Indices	Historical Year (1979) Units	Baseline Year (1980) Units	Forecast Year (1988) Units	Data Source(s)	Comments
Number of Motor Vehicles Accidents (MVAs)					
Number of Driving while Intoxicated (DWI) Arrests					
Number of Divorces					
Number of Aid to Families with Dependent Children (AFDC) Recipients					
Medicare					
Hospitals					
Persons enrolled		232			
Benefit payments ($ millions)		.1			
Medical					
Persons enrolled		116			
Benefit payments ($ millions)		*z			

* Less than $50,000

Source: County and City Data Book 1983, Bureau of the Census.

0966R

BASELINE TABLE

HEALTH SECTOR

Table G(4)(a): EPIDEMIOLOGICAL MEASURES

Hope PLANNING AREA

Measures\ Indices	Historical Year (1979) Units	Baseline Year (1981) Units	Forecast Year (1988) Units	Data Source(s)	Comments
Number of Serious Crimes		375			
Property		322			
Violent		53			
Drug Abuse Prevalence					
Leading Causes of Death	(Cause)	(Cause)	(Cause)		
(1)					
(2)					
Leading Causes of Morbidity	(Cause)	(Cause)	(Cause)		
(1)					
(2)					
Sexually Transmitted Disease (STP) Incidence					
Number of Births		158			
Number of Deaths		47			
Number of Perinatal Deaths					

Source: County and City Data Book 1983, Bureau of the Census.

BASELINE TABLE

Table G(5)(a): **NUMBER OF CHURCHES** AND MEMBERSHIP

Hope PLANNING AREA

Activity Measures	Historical Year [1971)	Baseline Year (1980)	Forecast Year	Data Sources	Remarks
(1) CHURCHES	16	17			
(2) MEMBERSHIP COUNT	2,695	2,621			
(3) AVERAGE DONATIONS PER MAJOR SECT					
CATHOLIC					
PROTESTANT					
JEWISH					

Source: Quinn, Bernard, et. **al,** Churches and Church Membership in the United States 1980, (also same title for 1971).

0977R

BASELINE TABLE

Table G (6) (a) : UNEMPLOYMENT DATA

Hope PLANNING AREA

Activity Measures	Historical Year	Baseline Year (1982)	Forecast Year	Data Sources	Remarks
TOTAL LABOR FORCE		3,074			
TOTAL UNEMPLOYED		293			
RATE OF UNEMPLOYMENT		9.5			

Source: County and City Data Book 1983, Bureau of the Census.

Public Finance

Effects data on direct OCS activity effects on planning area level public revenues and outlays was not identified in any secondary sources. A few studies have been done on the effect of OCS development on specifies local communities but this has not been extrapolated due to insufficient project resources to develop the necessary analytic basis.

(0981R)

EFFECTS TABLE

Table G(7)(b): PUBLIC FINANCE DATA

Effects Measures	(1) Dollars Equivalent of Effects Measure Change (+/-)	(2) Production (BOE)	(3) Barrels of oil Equivalent (1) ÷ (2) = 3	(4) Remarks
(1) Total Government Revenue				
(2) Total Government Expenditure				

[a] All secondary data sources identified reviewed state and/or selected local public finance data which did not discuss effects measures or impacts relevant to OCS planning areas. The state data were not specific enough and the selected local data was not inclusive enough and would require primary data collection efforts.

SOURCES:

2322c

Arctic Subregion

This section presents public finance data for the Arctic Subregion areas of:

- o Diapir Field
- o Barrow Arch
- o Hope Basin

The public finance sector data are shown in Table G (7) (a). The baseline data for 1977 shown in this table indicate that the Arctic Region is characterized by the following relationships in public revenue and outlay (expenditure) baseline pattern.

For the Diapir Field area:

- o General revenues of $107 million
- o Tax revenues of $46 million of which $221 thousand came from other taxes in which many OCS development related taxes reside
- o Outlays were $34.2 million with:
  - $13.2 million for education
  - $2.2 million for highways
  - $0 million for welfare
  - $411 thousand for health and hospitals
  - $583 thousand for police protection

General Debt stood at $137 million

0975R/

BASELINE TA8LE

Table G(7)(a) PUBLIC FINANCE DATA

DIAPIR FIELD PLANNING AREA

Activity Measures	Historical Data	Baseline Year (1977), ($1,000)	Data Source(s)	Comments
*(1) General Revenue		$ 107,801		
* (a) Intergovernmental		48,049		
(b) Taxes		44,728		
Property		2>,741		
Sales and Gross Receipts		14,766		
Other Taxes		221		
* (c) Other revenues		15,024		
(2) Direct General Expenditure		34,265		
(a) Education		13,226		
(b) Highways		2,227		
(c) Public welfare		---		
(d) Health and hospitals		411		
(e) Police protection		583		
(3) General Debt Outstanding		137,031		

*Excludes internal revenue

Source: County and City Data Book 1983, Bureau of the Census

No data were available for the Hope Basin Area.

(0981R)

EFFECTS TABLE

Table G(7)(b): PUBLIC FINANCE DATA

Effects Measures	(1) Dollars Equivalent of Effects Measure Change (+/-)	(2) Production (BOE)	(3) Barrels of oil Equivalent (1) ÷ (2) = 3	(4) Remarks
(1) Total Government Revenue				
(2) Total Government Expenditure				

[a] All secondary data sources identified reviewed state and/or selected local public finance data which did not discuss effects measures or impacts relevant to OCS planning areas. The state data were not specific enough and the selected local data was not inclusive enough and would require primary data collection efforts.

SOURCES:

2322c

0975R/

BASELINE TABLE

Table G(7) (a) **PUBLIC FINANCE DATA**

HOPE **BASIN PLANNING AREA**

Activity Measures	Historical Data	Baseline Year (1977) ($1,000)	Data Source(s)	Comments
*(1) General Revenue		$ N/A		
* (a) Intergovernmental		N/A		
(b) Taxes		N/A		
Property		N/A		
Sales and Gross Receipts		N/A		
Other Taxes		N/A		
*(c) Other revenues		N/A		
(2) Direct General Expenditure		N/A		
(a) Education		N/A		
(b) Highways		N/A		
(c) Public welfare		N/A		
(d) Health and hospitals		N/A		
(e) Police protection		N/A		
(3) General Debt Outstanding		N/A		

*Excludes internal revenue

Source: County and City Data Book 1983, Bureau of the Census

1. Effects (Table G(8) (b)) Police Officers

a. Total payroll cost increases for police officers may be about $7,041,204 as a result of OCS oil- and gas-related activities associated with the 1984 lease offering in the Diapir Field Planning Area

It is estimated that about 1 police officer is needed for every 500 residents. Based on this ratio, total police officer years may be 317 over the project life. Total payroll cost for police officers in the onshore communities impacted on by OCS oil- and gas-related activities *in* the Diapir Field Planning Area may be $7,041,204. This estimate is based on the average salary for a police officer of $22,212 in the Seattle, Washington area.

b. Dollar effects may be about $.00234 per barrel of oil equivalent

Based on projected production of about 3,000 million barrels of oil equivalent, dollar effects may be $.00234 per barrel of oil equivalent over the project life of the lease sale.

c. Summary

Total payroll costs for police officers may be $7,041,204, or $.00234 per barrel of oil equivalent as a result of OCS oil- and gas-related activity in the Diapir Field Planning Area.

2299c

EFFECTS TABLE

Table G(8)(b): POLICE PERSONNEL AND BUDGET STATISTICS

DIAPIR FIELD PLANNING AREA

Effects Measures	(1) Dollars Equivalent of Effects Measure Change (+/-)	(2) Production (BOE)	(3) Effects per BOE (1) ÷ (2) = 3	(4) Remarks
(1) TOTAL ANNUAL PAYROLL OF POLICE FORCE (DOLLARS)	[a]7,041,204	3,000 mm	.00234	
(2) ANNUAL EQUIPMENT BUDGET PER SIZE OF POLICE FORCE (DOLLARS)				

[a] Estimate is based on the national average of 1 police officer per 500 residents. The 1979 annual salary per officer ($23,212)[2] based on Seattle, Washington area is multiplied by the number of police officer years (317)[3] over the project life. The number of additional police officers demanded peaks in 1997 at approximately 29 officers.

Sources:

[1] Alaska OCS T.R. No. 46, vo1. 2, BLM, 1980, P. A-48.
[2] Bureau of Labor Statistics, personal communications.
[3] 3/84 EIS.

BASELINE TABLE

Table G(8)(a): POLICE PERSONNEL AND BUDGET STATISTICS

Activity Measures	Historical Data Year (1977)	Baseline Year (1982)	Forecast Year (1987)	Data Source(s)	Remarks
(1) Size of Police Force				Sourcebook of Criminal Justice Statistics, 1977 and 1982; Survey of Police Operational ational Administrative Practices - 1981	
(2) Annual Payroll					
(3) Annual Equipment Budget					

[a] Data are available for relatively few counties, preventing planning area aggregation of this information.

SOURCES:

2323c

EFFECTS TABLE

Table G(9)(b): BANKS AND TOTAL VALUE OF DEPOSITS

Effects Measures	(1) Dollars Equivalent of Effects Measure Change (+/-)	(2) Production (BOE)	(3) Barrels of oil Equivalent (1) ÷ (2) = 3	(4) Remarks
(1) Increase in No. Banks Times Average Value of Deposits				

a There were no secondary data that discusses the above effects measure. Would require primary data collection and analysis.

SOURCES:

2324c

For the Arctic subregion area the banking subsector data indicates that for the Diapir area:

- o From the historical year of 1978, to the baseline year of 1982, the number of banks or branches

  declined from two to one
  a substantial increase in an area of unit branch banking

- o Total value of deposits went from $9 million to 8 million.

These changes are due to a multiplicity of factors, of which any OCS development is only and, in this case, probably, a contributing factor, with the decline being due to the levelling and retreat from aggresive OCS development by major producers.

(0981R)

0975R/

BASELINE TABLE

Table G(9)(a): BANKS AND TOTAL VALUE OF DEPOSITS

DIAPIR PLANNING AREA

Activity Measures	Historical Year (1978)	Baseline Year (1982)	Forecast Year	Data Source(s)	Remarks
(1) NUMBER OF BANKS OR BRANCHES (uNITS)	2	1			
(2) TOTAL VALUE OF DEPOSITS (Millions of dollars)		8			

Source: FDIC : Banks & Branches Data Book: June 30, 1978
FDIC : Banks & Branches Data Book (Vols. 1-19) June 30, 1982

For the Arctic subregion area the banking subsector data indicates that for Hope Planning area:

o From the historical year of 1978, to the baseline year of 1982, the number of banks or branches

stayed constant at one bank

o Total value of deposits went from $6 million to 7 million.

These changes are due to a multiplicity of factors, of which any OCS development is only and; in this case, probably, a minimal factor.

(0981R)

0975R/

BASELINE TABLE

Table G(9)(a): BANKS AND TOTAL VALUE OF DEPOSITS

HOPE PLANNING AREA

Activity Measures	Historical Year (1978)	Baseline Year (1982)	Forecast Year	Data Source(s)	Remarks
(1) NUMBER OF BANKS OR BRANCHES (UNITS)	1	1			
(2) TOTAL VALUE OF DEPOSITS (Millions of dollars)		7			

Source: FDIC : Banks & Branches Data Book: June 30, 1978
FDIC : Banks & Branches Data Book (Vols. 1-19) June 30, 1982

1. Effects (Table G(10) (b)) Residential Housing Units

a. The average annual cost of the increase in residential housing demand may be $8,547,840 a year over the project life of the lease sale as a result of OCS oil- and gas-related activities in the Diapir Field Planning Area

It is estimated that the demand for one housing unit is generated by each 3.18 new residents moving within the onshore area impacted on by OCS oil- and gas-related activities in the Diapir Field Planning Area. The average annual number of housing units that will be required may be about 1,920 over the project life. When multiplied times the annual housing rental payment, estimated at $4,452, the average annual cost of residential housing units is $8,547,840. Peak housing demand is estimated to occur in 1997 at 4,627 units.

b. Dollar Effects may be about .07384 per barrel of oil equivalent

Based on projected production of about 3,000 million barrels of oil equivalent over the project life of the lease sale, the dollar effects may be about $.07384 per barrel of oil equivalent.

c. Summary

Average annual residential housing costs may be about $8,547,840 and total effects per barrel of oil equivalent over the project life may be about .07384.

2293c

Table G(10) (b): BUILDING PERMITS BY TYPE OF CONSTRUCTION

DIAPIR FIELD PLANNING AREA

Effects Measures	(1) Dollars Equivalent of Effects Measure Change (+/-)	(2) Production (BOE)	(3) Effects per (BOE)	(4) Remarks
(1) RESIDENTIAL				
(a) AVERAGE ANNUAL NUMBER OF HOUSING UNITS TIMES AVERAGE RENT PER UNIT	$8,547,840[a]	3,000 mm	.07384	
(2) INDUSTRIAL/MANUFACTURING				
(a) NUMBER OF INDUSTRIAL/ MANUFACTURING BUILDINGS TIMES AVERAGE COSTS OF BUILDINGS				
(3) PUBLIC BUILDINGS				
(a) NUMBER OF PUBLIC BUILDINGS TIMES AVERAGE PRICE OF BUILDING				

a/ Estimate is based on 1 housing unit per 2.75 new residents.[2] An annual housing rental payment ($4,452)4/ based on the Anchorage Area is multiplied by the average annual number of housing units demanded (1,290)1/ over the project life. A housing unit is a house, or apartment, a group of rooms, or a single room occupied as separate living quarters.[3] Peak housing demand in 1997 is 4,627 units. Effects per BOE are total dollar effects over the project life.

Sources:

1/ 3/84 EIS.
2/ Pacific OCS Technical Paper No. 83-3, MMS, p. 5.
3/ 1980 Census of Population and Housing, U.S. Bureau of Census,
4/ 1980 County and City Data Book, U.S. Bureau of Census.

Arctic Region

No housing permit data was available for this region or the planning areas in it.

2316c

0975R/

BASELINE TABLE

Table G(10) (a): BUILDING PERMITS BY
TYPE OF CONSTRUCTION

DIAPIR PLANNING AREA

Activity Measures	Historical Year	Baseline Year (1981)	Forecast Year	Data Source(s)	Remarks
(1) RESIDENTIAL					
(a) SINGLE-HOUSING		Not Available			
(b) MULTIPLE-HOUSING		Not Available			
(c) TOTAL VALUATION ($000s)		Not Available			
(2) INDUSTRIAL/MANUFACTURING					
(3) PUBLIC BUILDINGS					

Residential permit and valuation include data for 0 of the 1 borough in the planning area.

Source: County and City Data Book 1983, Bureau of the Census

0975R/

BASELINE TABLE

Table G(10) (a): BUILDING PERMITS BY
TYPE OF CONSTRUCTION

HOPE PLANNING AREA

Activity Measures	Historical Year	Baseline Year (1981)	Forecast Year	Data Source(s)	Remarks
(1) RESIDENTIAL					
(a) **SINGLE-HOUSING**		**Not Available**			
(b) MULTIPLE-HOUSING		**Not Available**			
(c) TOTAL VALUATION ($000s)		**Not Available**			
(2) INDUSTRIAL/MANUFACTURING					
(3) PuBLIC BUILDINGS					

Residential permit and valuation include data for O of the 1 borough in the planning area.

Source: County and City Data Book 1983, Bureau of the Census

EFFECTS TABLE

Table G(n)(b): LPG AND NATURAL GAS CONSUMPTION BY TYPE OF USER

Effects Measures	(1) Dollars Equivalent of Effects Measure Change (+/-)	(2) Production (BOE)	(3) Barrels of oil Equivalent (1) ÷ (2) = 3	(4) Remarks
(1) Residential				
(a) Natural Gas				
1. Cubic Feet Consumed Times Average Cost per Cubic Foot				
(b) LPG				
1. Cubic Feet Consumed Times Average Cost per Cubic Foot				
(2) Industrial				
(a) Natural Gas				
1. Cubic Feet Consumed Times Average Cost per Cubic Foot				
(b) LPG				
1. Cubic Feet Consumed Times Average Cost per Cubic Foot				

EFFECTS TABLE

Table G(n)(b): LPG AND NATURAL GAS CONSUMPTION BY TYPE OF USER (Continued)

Effects Measures	(1) Dollars Equivalent of Effects Measure Change (+/-)	(2) Production (BOE)	(3) Barrels of oil Equivalent (1) ÷ (2) = 3	(4) Remarks
(3) Total				
(a) Natural Gas				
1. Cubic Feet Consumed Times Average Cost per Cubic Foot				
(b) LPG				
1. Cubic Feet Consumed Times Average Cost per Cubic Foot				

[a] All relevant secondary data that exist (if it does) are proprietary. Secondary data analyses of the above effects measures do not exist.

SOURCES:

2326c

BASELINE TABLE

Table G(n)(a): LPG AND NATURAL GAS TRANSPORT AND CONSUMPTION

Activity Measures	Historical Year (1978)	Baseline Year (1982)	Forecast Year (1987)	Data Source(s)	Remarks
(1) Miles of Gas Pipeline				American Gas Association	
(2) Miles of LPG Pipeline					
(3) Cubic Feet Consumed:					
Residental					
(a) Natural Gas					
(b) LPG					
Industrial					
(a) Natural Gas					
(b) LPG					
Service Industry					
(a) Natural Gas					
(b) LPG					

[a] LPG and natural gas piping and consumption data were not available by county (necessary for planning area aggregation).

SOURCES:

1. Effects (Table G(12) (b)) Residential Kilowatt Hour Consumption

a. Average annual residential kilowatt consumption dollar effects may be about $3,440,640, as a result of OCS oil- and gas- activities associated with the 1984 lease sale in the Diapir Field Planning Area

As a result of OCS oil- and gas-related activity in the Diapir Field Planning Area, an average annual increase in demand for 1,920 residences may generate an associated demand for 11,200 kilowatt hours (kwhs) per residential customer. When the resulting product is multiplied times the 1984 retail price per kwh, estimated at .0161 (based on Anchorage data), the average annual kilowatt hour dollar effect may be about $3,440,640 over the project life of the lease sale. Kilowatt hour usage peaks in 1997 at 51,819,370 kwh.

b. Dollar effects may be about $.0296 per barrel of oil equivalent

Based on projected production of 3,000 million barrels of oil equivalent, the total dollar effects may be about $.0296 per barrel of oil equivalent over the project life of the lease sale.

c. Summary

Average annual kilowatt consumption dollar effects generated by OCS oil- and gas-related activities in the Diapir Field Planning Area may be about $3,440,640 and total per barrel of oil equivalent effects over the project life of the lease sale may be about $.0296.

2294c

Table G(12) (b): CONSUMPTION OF KILOWATT HOURS BY TYPE OF USER

DIAPIR FIELD PLANNING AREA

Effects Measures	(1) Dollars Equivalent of Effects Measure Change (+/-)	(2) Production (BOE)	(3) Effects per (BOE)	(4) Remarks
(1) RESIDENTIAL				
(a) AVERAGE ANNUAL KILOWATT HOURS CONSUMED TINES AVERAGE ANNUAL COST OF KILOWATT HOUR	$[a]3,440,640	3,000mm	.0296	
(2) INDUSTRIAL				
(a) AVERAGE ANNUAL KILOWATT HOURS CONSUMED TIMES AVERAGE ANNUAL COST OF KILOWATT HOUR				
(3) SERVICES				
(b) AVERAGE ANNUAL KILOWATT HOURS CONSUMED TIMES AVERAGE ANNUAL COST OF KILOWATT HOUR				

a/ Estimate is based on an average annual number of new or sustained OCS-related customers (1,920)[1] over the project life times the Alaska Electric Light and Power Co. 1982 sales per ultimate customer (11,200 KWH)[2]. The resulting number is multiplied by the 1984 retail price per KWH (.0161)[3] based on Seattle, Washington. KWH usage peaks in 1997 at 51,819,370. Effects per BOE are total dollar effects over the project life.

Sources:

1/ 1983 EIS
2/ 1983 Financial Statistics of Selected Electric Utilities, EIA, Feb. 1984
3/ EIA, personal communication
2277c

BASELINE TABLE

Table G(12) (a): CONSUMPTION OF KILOWATTS BY TYPE OF USER

Activity Measures	Historical Year (1978)	Baseline Year (1981)	Forecast Year (1986)	Data Source(s)	Remarks
(1) Residential Consumption					
(2) Industrial Consumption					
(3) Service Industry Consumption					

[a] Baseline electric power consumption data were not available below the state level of aggregation.

SOURCES:

2327c

EFFECTS TABLE

Table G(13) (b): KILOWATT GENERATION BY FACILITY

Effects Measures	(1) Dollars Equivalent of Effects Measure Change (+/-)	(2) Production (BOE)	(3) Barrels of oil Equivalent (1) ÷ (2) = 3	(4) Remarks
(1) Kilowatt Hours Generated per Population Times Average Cost Per Kilowatt Hours				

[a] OCS activity effects on electric generation capacity have been sufficiently modest that secondary sources refer to additional consumption but not additional capacity.

SOURCES:

2331c

BASELINE TABLE

Table G(13) (a): KILOWATT GENERATION BY FACILITY

Activity Measures	Historical Year (1978)	Baseline Year (1981)	Forecast Year (1986)	Data Source(s)	Remarks
(1) Nameplate Capacity					
(2) Kilowatt Hours Generated Annually					
(3) Months of Peak Generation per Annum					
(4) Kilowatt Hours Generated Per Population					

[a] Facility data tentatively have been identified at the U.S. Department of Energy (Energy Information Administration) but limited resources prevented manual accumulation and aggregation.

SOURCES:

2328c

1. Effects (Table G(14) (b)) Water Usage

a. Average annual residential water usage costs may increase by $557,172 a year as a result of OCS oil- and gas-related activities associated with the 1984 Lease offering in the Diapir Field Planning Area

Based on the average annual number of new residents over the project life of the lease sale, $557,172 worth of water will be utilized or consumed each year. These residents are estimated to utilize/consume approximately 45,620 gallons of water per person over this same time period. Based on the 1981 retail price per gallon, estimated at $.002 (based on similar data in Anchorage, Alaska), the average annual residential water usage costs may peak in 1997 at 278,586,250 gallons.

b. Dollar effects may be about $.00481 per barrel of oil equivalent

Based on projected production of about 3,000 million barrels of oil equivalent resulting from OCS oil- and gas-related activity in the Diapir Field Planning Area, the total dollar effects of the increase in average annual residential water usage may be about $.00481 per barrel of oil equivalent over the project life of the lease sale.

c. Summary

Average annual residential water usage cost may increase by $557,172 and total dollar effects per barrel of oil equivalent over the project life of a lease sale may be $.00481.

2296c

EFFECTS TABLE

Table G(14)(b): WATER USAGE/CAPACITY

DIAPIR FIELD PLANNING AREA

Effects Measures	(1) Dollars Equivalent of Effects Measure Change (+/-)	(2) Production (BOE)	(3) Effects per (BOE)	(4) Remarks
(1) RESIDENTIAL				
(a) Average Annual Usage (gls) times Average Price per Gallon	$557,172[a]	3,000mm	$.00481	
(2) Industrial				
(a) Average Annual Industrial Usage (gls) times Average Price per Gallon.				
Onshore				
Offshore				

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a/ Estimate is based on an average annual number of new residents over the project life times an annual water usage per person of 45,620 gls[1] times the 1981. Retail price per gallon $.002 based on similar usage in Anchorage, Alaska. Water usage peaks in 1997 at 278,586.250 gls.

Sources:

1/ Alaska OCS Technical Report Mu-46, Vol. 2 BLM 1980
2/ 1981 Water Utility Operating Data, American Water Works Association, 1981
3/ 3/84 EIS

ID 2274c

BASELINE TABLE

____________________ **PLANNING AREA**

Table G(14) (a): ONSHORE WATER USAGE/CAPACITY

Activity Measures	**Historical Data** Year (1978)	**Baseline** Year (1982)	**Forecast** Year (1987)	**Data** Source(s)	Remarks
(1) No. of Drinking Water (By No. of Service Connections)					EPA Office of Drinking Water Data Reporting System
(2) Plant Capacities **(GLS)**					
(3) No. of Violations Reported (By **Major Type** of **Violations)**					

[a] The above data were requested under the Freedom of Information Act on June 20, 1984, but were delayed by higher priority work at EPA. The data now have been received but would require extensive primary analytic work to aggregate, validate, and interpret the information. The necessity of primary analysis and the related level of effort put that work well beyond the scope of the project. Therefore, the water data are not available for this Table.

SOURCES:

2329c

1. Effects (Table G(15) (b)) Telephone Lines

a. The total cost of telephone lines installed as a result of OCS oil- and gas-related activities in the Diapir Field Planning Area may be about $323,890 over the project life of the lease sale

It is estimated that residential housing demand will peak in 1997 within the impacted onshore area as a result of OCS oil- and gas-related activities. If we assume that these OCS generated residences will require an average of 2 lines per household at an average installation cost of $35.00, then the total cost may be $323,890. In reality, the existing supply of telephone units will partially meet additional demand.

b. Dollar effects may be about .000107 per barrel of oil equivalent

Based on projected production of about 3,000 million barrels of oil equivalent, the dollar effects may be about $.000107 per barrel of oil equivalent.

c. summary

The total cost of installing telephone lines in the households generated by OCS oil- and gas-related activities in the Diapir Field Planning Area may be about $323,890 or $.000107 per barrel of oil equivalent over the project life of the sale lease.

2298c

EFFECTS TABLE

Table G(15) (b) : TELECOMMUNICATIONS STATISTICS

DIAPIR FIELD PLANNING AREA

Effects Measures	(1) Dollars Equivalent of Effects Measure Change (+/-)	(2) Production (BOE)	(3) Effects per (BOE) (1) ÷ (2) = 3	(4) Remarks
(1) RESIDENTIAL				
(a) NUMBER OF TELEPHONES TIMES: AVERAGE COST OF PER PHONE	$ 323,890[a]	3,000mm	.000107	
(2) INDUSTRIAL				
(a) NUMBER OF LAND MOBILE LICENSES TIMES AVERAGE COST OF EQUIPMENT				
(3) NUMBER OF MARINE LICENSES TIMES (b) KILOWATT HOURS CONSUMED AVERAGE COST OF EQUIPMENT				
(4) NUMBER OF AVIATION LICENSES TIMES AVERAGE COST OF EQUIPMENT				
(5) NUMBER OF A.M. RADIO STATIONS TIMES AVERAGE COST OF OPERATIONS				
(6) NUMBER OF F.M. RADIO STATIONS TIMES AVERAGE COST OF OPERATIONS				

a/ Estimate is based on 2 phone lines[1] per additional housing unit[2] in the peak year times the average cost per phone line $35[3] A line is defined as a telephone unit.

Sources:

1/ Alaska OCS Technical Report No. 46, Vol. 2, BLM 1980
2/ 12/83 EIS
3/ Executive Resource Associates estimate.
2279c

Arctic Region

This section presents telecommunication data for:

Hope
Diapir

Table G(15) (a) presents baseline data for telecommunications in the Diapir area. The data in the table show that there are no stations in the area.

Table G(15) (a) presents baseline data for telecommunications in the Hope area. The data in the table show that:

In 1978, there were

0 Television Stations
1 AM Radio Stations
0 FM Radio Stations

In 1982, there were

0 Television Stations
1 AM Radio Stations
0 FM Radio Stations

Based on these data, and other factors it is possible to observe that there was no change in telecommunication services in this planning area between the historical and baseline periods.

2262c

0975R/

Activity Measures	Historical Year (1978)	Baseline Year (1982)	Forecast, Year (1987)	Data Source(s)	Remarks
(1) TELEPHONES					
(2) LICENSES GRANTED					
(a) LAND MOBILE					
(b) MARINE					
(c) AVIATION					
(3) TELEVISION STATIONS	0	0			
(4) AM RADIO STATIONS	0	0			
(5) FM RADIO STATIONS	0	0			

The numbers of television, AM radio and FM radio stations were determined from Broadcasting Yearbook editions for 1978 and 1982 for the stations within the counties and boroughs of the study area.

0975R/

BASELINE TABLE

Table (#15)(a): TELECOMMUNICATIONS STATISTICS

HOPE PLANNING AREA

Activity Measures	Historical Year (1978)	Baseline Year (1982)	Forecast Year (1987)	Data Source(s)	Remarks
(1) TELEPHONES					
(2) LICENSES GRANTED					
(a) LAND MOBILE					
(b) MARINE					
(c) AVIATION					
(3) TELEVISION STATIONS	0	0			
(4) AM RADIO STATIONS	1	1			
(5) FM RADIO STATIONS	0	0			

The numbers of television, AM radio and FM radio stations were determined from **Broadcasting Yearbook editions for 1978** and 1982 for the stations within the counties and boroughs of the study area.

TAB X

MILITARY OPERATIONS

8. <u>Military Operations</u>

No quantitative effects data were available for this sector, The nature of these effects is described below, however. This provides readers with some indication of OCS activity effects.

Military operations are affected by OCS activity, Potential conflicts have been discussed openly in public documents such as the 1/83 EIS OCS lease sales in the three planning areas of the Gulf of Mexico. The potential conflicts include interruption or interference with a broad range of military operations in the air space, in the sea, below the surface, and on the ocean bottom of proposed lease areas. The affected operations include training missions (aircraft and ship), missile tests, tests of ships and subsurface equipment, electronic surveillance activities, and other active defense systems. Host of the potentially affected operations and their locations are not discussed publicly. There is communication between the Department of Defense and the Department of Interior regarding sensitive OCS areas. However, the public information is very limited for security reasons.

Since specific data regarding the type, frequency, and location of military missions in and near OCS planning areas are largely unavailable for this study, effects data are not shown. It is possible that representative estimates of the percentage area that is likely to be in dispute can be developed for respective planning areas. For instance, a recent memorandum to Secretary William P. Clark from the Department of Defense suggests that the U.S. Navy has defined the areas of conflicting use within lease sale areas. If the areal extent of the restricted area is divided by the overall lease sale area, an average percentage is then available for approximating conflicting use. The use of that percentage relationship has been proposed to HHS and that proposal is reiterated here in the absence of effects data for universal activity measures that describe military operations effects of OCS activities.[1/]

Universal measures of direct OCS activity effects on planning area military operations were not identified in any secondary source. When an effect was identified, the attending data ususally were not publicly available. Where they were available, they were only for limited segments of our study area. That limited data could not be extrapolated to other planning areas, let alone valued on any comparable basis.

What we have presented for each planning area is the nature of military operations in the area in terms of what base(s) are there. This provides some indication of the possible category of use conflicts and OCS effects.

1/ HHS is attempting to obtain this information from Interior and DOD.

2286c

The military installations affected in the Arctic Region Region could include electronic surveillance and detection facilities.

The military anticipate negligible OCS effects on hospital activity.

2286c

EFFECTS TABLE

Table H(l)(b): MILITARY NON-MEDICAL INSTALLATIONS

Effects Measures	(1) Dollars Equivalent of Effects Measure Change (+/-)	(2) Production (BOE)	(3) Barrels of oil Equivalent (1) (2) = 3	(4) Remarks
(1) Value of Installation to Local Economy				
Payroll (Military & Civilian)				
Purchases (for Base Operation)				
Total				

[a] Military effects data are largely unavailable for security reasons. An alternative approach that would provide one comprehensive measure of effects ‘has been proposed to MMS.

SOURCES:

2332c

EFFECTS TABLE

Table H(2) (b): MILITARY MEDICAL INSTALLATIONS

Effects Measures	(1) Dollars Equivalent of Effects Measure Change (+/-)	(2) Production (BOE)	(3) Barrels of oil Equivalent (1) ÷ (2) = 3	(4) Remarks
(1) Value of Installation to Local Economy				
Payroll (Military & Civilian)				
Purchases				
Total				

[a] No effect in military medical installations is anticipated unless there is a major offshore disaster that necessitates the use of military facilities. Even then the effects should be minor.

SOURCES:

8. Military Operations

a. Numerous military installations are located in the coastal area that has been directly associated with OCS activity for this study. It has been possible to obtain certain information from many locations (the military public information offices have been cooperative.). However, the activity data (e.g., departure, mission, and secret location information) that are the important measures for this study generally are not publicly available.

An alternative to the activity measure data has been proposed to MMS (see Military Operations effects discussion). That alternative could provide both baseline data as well as effects multipliers for respective planning areas,

Medical installation baseline data have been collected from an American Hospital Association publication. The data for the planning area are shown in Table H(2)(a) among the tables following this short baseline discussion, It is unlikely that military medical facilities will be affected by OCS activity unless a catastrophe occurs,

2288c

BASELINE TABLE

Table H(l)(a): MILITARY NON-MEDICAL INSTALLATIONS

Activity Measures	Historical Data 19_	19_	Baseline Year (19_)	Forecast Year (____)	Data Source(s)	Remarks
Personnel						
Authorized Full-Time Assigned (Peak Number)						
Military						
Civilian						
Other (Contractor, Students, Reservists)						
Total						
Total Acreage						
Operations Intensity						
Training Exercises (Person hours)						
Departures (Number of, if Appropriate)						
Ships/Aircraft						
Search and Rescue Missions						
Events (Number of)						
Total Person Hours						

2330c

BASELINE TABLE

Table H(l)(a): MILITARY NON-MEDICAL INSTALLATIONS (Continued)

Activity Measures	Historical Data 19_	19_	Baseline Year (19_)	Forecast Year (____)	Data Source(s)	Remarks
Value of Installation to Local Economy						
Payroll (Military and Civilian)						
Purchases (for Base Operation)						
Total						

[a] Data collected are incomplete and omit various installations. Operational information (the most important element) are generally unavailable for activity measures that relate to OCS activity, ususally for security reasons.

SOURCES:

2330c

BASELINE TABLE

Table H(2)(a): MILITARY MEDICAL INSTALLATIONS

DIAPIR PLANNING AREA

	Historical Data	Baseline Year 1982'	Forecast Year ( )	Source(s)	Comments
Personnel					
Authorized full-time assigned (peak number)					
Military					
Civilian					
Other (contractor, students, reservists)					
Total					
Total Acreage					
Operations Intensity					
Number of beds		o			
Patients admitted (total year)		0			
# of Hospitals		0			
Occupancy		o%			
Census		o			
Value of Installation to Local Economy					
Payroll (military and civilian)					
Purchases					
Total					

*Average number of inpatients receiving care each day during a 12-month period.

BASELINE TABLE

Table H(2)(a): MILITARY MEDICAL INSTALLATIONS

HOPE PLANNING AREA

	Historical Data	Baseline Year 1982	Forecast Year ( )	Source(s)	Comments
Personnel					
Authorized full-time assigned (peak number)					
Military					
Civilian					
Other (contractor, students, reservists)					
Total					
Total Acreage					
Operations Intensity					
Number of beds		0			
Patients admitted (total year)		0			
# of Hospitals		0			
Occupancy		0%			
Census		0			
Value of Installation to Local Economy					
Payroll (military and civilian)					
Purchases					
Total					

*Average number of inpatients receiving care each day during a 12-month period.

X-9

2288c

TAB X

AIR AND WATER QUALITY

9* AIR QUALITY

Int roduct ion

OCS-related activities contribute to the reduction of ambient air quality through the emission of various pollutants. However, the emissions are small when compared to other activities that generate air pollutants.

Specifically, pollutants from the following OCS activities have an effect on ambient air quality.

1. Exploration Phase: resulting from a) actual drilling and b) equipment used for support activity both onshore and offshore.

2. Development Phase: resulting from a) platform installation, b) pipeline installation, c) development drilling and d) support activities.

3. Productive Phase: resulting from a) platform production emissions such as production power generation, venting and flaring, evaporation losses and production support activities, b) offshore oil and gas processing activities such as power generation, fugitive emissions and tail gas incineration, and c) oil and gas transportation.

4. Storage of oil and gas produced.

5* Processing of oil and gas onshore.

Note, however, that for various Lease Sales, the Department of the Interior has estimated and projected, in their Environmental Impact Statements, pollutant emissions resulting from OCS activities from the Exploration Phase through the life cycle of the field. Additionally, for some Lease Sales and counties, the EISs provide information on ambient air quality resulting from OCS activities.

Airborne pollutants from OCS activities may diminish ambient air quality, thereby (1) reducing levels for other activities such as outdoor recreation (2) result in health hazards, causing increased morbidity and mortality and/or (3) result in material damages from corrosion. There is considerable, though controversial, information in the literature to support all of the above.

Tables 1 through 6 identify the levels of several air pollutants resulting from OCS-related activities.

The OCS-related effects on air pollution have been expressed in terms of specific air pollutant emissions by particular OCS activity per B.O.E. of mean hydrocarbon resource estimate. No attempt has been made to quantify these emission estimates in terms of associated morbidity and mortality or damage to the environment. There are two reasons for this.

1. Only emission data re available. We do not have the resulting changes in ambient air quality because the specific locations of OCS activities for any lease sale are not known.

2. It is especially difficult to convert the relatively small air pollution emissions from OCS activities to morbidity/mortality effects. This point has been stated by the MMS staff in response to our preliminary data tables. Specifically, MMS's review of our data tables stated:

   "It is appropriate to quantify health and materials impact from pollutants resulting from OCS operations. OCS sources are required to meet all applicable health standards and only very small incremental increases in pollutant levels would be allowed. There may be economic impacts resulting from emissions controls required on OCS operators. All other impacts would only be significant if one considers all existing offshore and onshore sources. It is not possible to isolate effects from OCS sources and the other sources."

Baseline data for ambient air quality are available from the Environmental Protection Agency's annual SORAD reports dating from 1971. The following air pollutants are reported on.

1. Particulate
2. Hydrocarbons
3. Ozone
4* Sulfur Oxides (SO_x)
5* Nitrogen Oxides (NO_x)
6. Carbon Monoxide (CO)

The pollutant data are presented as micrograms per cubic meter of air for various averaging time periods and contain the following:

1. number of observations;
2. minimum and maximum observations;
3. arithmetic and geometric mean and standard deviations; and
4. the following percentiles: 10, 30, 50, 70, 90, 95, and 99.

The data are organized by state and identify cities, urban areas and/or counties where the ambient air monitoring station is located. A specific site designation number permits determination of precise location of the monitoring station.

A problem with SOW data is its inconsistency of observations over time for specific monitoring stations and/or pollutants. For example, in 1975, 17 SORAD monitoring stations reported ambient air concentrations; in 1982 only 2 stations (Houston and Southern California) reported information on hydrocarbon concentrations. There are also a number of instances where certain stations reported information in 1975 and 1978, but no data was available for 1982. Other stations reported ambient air quality data in 1982 did not do so in 1978 or 1975. Whether these stations merely failed to report data or were not in existence in particular years is not known. In light of this, using SORAD data may be difficult for establishing baseline scenarios.

AIR POLLUTION EFFECTS TABLES
ALASKA - DIAPIR FIELD PLANNING AREA

Table I-lb presents the effects of OCS-related activities on air pollution emissions in this Planning Area. Emissions by airborne pollutants are presented in terms of emissions for lifespan of OCS activities and emissions per B.O.E. of mean hydrocarbon resource estimate.

Table I-lb

ESTIMATED MAXIMUM ANNUAL EMISSIONS DUE TO OCS-RELATED ACTIVITIES
OF SELECTED AIR POLLUTANTS,
ALASKA - DIAPIR FIELD PLANNING AREA

Phase of OCS Activity	Emissions (tons/year)					Emissions for Lifespan of OCS Activities						Emissions for Lifespan per B.O.E. Mean Hydrocarbon Resource (x 10^{-6})					
	VOC	NO_x	SO	CO	TSP	VOC	NO_x	SO_x	CO	TSP	Total	VOC	NO	Soso	CO	TSP	Total
Exploratory 1/	32	289	17	40	17	96	867	51	120	51	1185						
Development 2/	215	875	94	284	47	860	3500	376	1136	188	6060						
Production 3/	302	788	125	283	46	6342	16548	2625	5943	966	32424						
Total						7298	20915	3052	7199	1205	39669	1.7	4.8	0.7	1.6	0.3	9.1

1/ Assumes exploratory activity duration of 3 years.
2/ Assumes development activity duration of 4 years.
3/ Assumes production activity duration of 21 years.

10. WATER QUALITY EFFECTS

Introduction

OCS-related activities result in discharges of effluents which may have a detrimental effect on ambient water quality in the area of OCS-activities. Specifically, ambient water quality may be affected by the following OCS operations:

1. drill cuttings
2. drilling muds
3. formation waters
4. sewage
5. hydrocarbons (oil spills).

The discharge of sewage can be dismissed from further consideration because of the insignificant volume involved, which, according to information presented in all Environmental Impact Statements (EIS's), has no effect on water quality.

Data on the discharge of drill cuttings, drilling muds, and formation waters indicates that impacts on the marine environment from these effluents tend to be local in nature and result primarily from mechanical rather than toxic properties of the substances. The chemical properties of drilling muds, drill cuttings and formation waters are present at levels that are easily diluted and dissolved by receiving waters. Thus, the concentration of each effluent is maintained at an acceptable level, and no harmful effects are imposed upon the marine environment. It must be kept in mind, however, that these conclusions are tentative and may be altered by the results of long-range tests presently in progress. We have therefore concluded that the effects from these three pollutants are negligible.

Hydrocarbon emissions, mostly from chronic and acute oil spills, do however, result in damage to the environment. The effects of hydrocarbon emissions are presented and discussed below. **Note** that these data are also presented in and agree with the data in the Oil Spills and Cleanup Costs section.

SUMMARY WATER QUALITY/HYDROCARBON POLLUTANT
EFFECTS TABLES
ALASKA - DIAPIR FIELD PLANNING AREA

Table 1 summarizes the cost estimates of hydrocarbon pollutants by effect category. Note that all of the costs in this table are estimated on the basis of per B.O.E. of Mean Hydrocarbon Resource Estimate.

Table 1

SUMMARY OF HYDROCARBON POLLUTANT COSTS IN THE
ALASKA - DIAPIR FIELD PLANNING AREA

Item	Costs/Effects
Cost of oil spills due to production and development per B.O.E. of mean hydrocarbon resource estimates	NA
Cost of oil spills due to transportation per B.O.E. of mean hydrocarbon resource estimates	NA
Total costs of oil spills per B.O.E. of mean hydrocarbon resource estimates	$0.00124

HYDROCARBON POLLUTION COST EFFECTS TABLES
ALASKA - DIAPIR FIELD PLANNING AREA

Tables J-lb through J-3b present pertinent information on OCS-related oil spill costs resulting from production and development and transportation per B.O.E. of estimated mean hydrocarbon resource estimates for this Planning Area. Other related information, such as total volume of oil spilled, is also presented.

Table: J-lb

OCS-RELATED HYDROCARBON POLLUTION DUE TO PRODUCTION AND DEVELOPMENT,
BY SIZE OF OIL SPILL,
ALASKA - DIAPIR FIELD PLANNING AREA,
FOR PROJECTED LIFESPAN OF OCS OPERATIONS 1/

Spill Size Category	Total Volume of Spills (bbl) Over Projected Lifespan	Estimated cost of Oil Spilled Per bbl (1983 $)	Estimated Total Costs of Oil Spilled (1983 $)	Cost Per BOE Estimated in Mean Hydrocarbon Resource Estimates 4/ (1983 $)
Less than 1,000 bbls	NA	29.00	NA	NA
1,000 to 9,999 bbls	NA	29.00	NA	NA
10,000 bbls and greater	NA	29.00	NA	NA
Estimated Total bbls	NA	29.00	NA	NA

1/ Assumes 28 year lifespan.

Source: FEIS Proposed Diapir Field Lease Offering, June 1984. (Hereafter 3/84 EIS).

Table: J-2b

OCS-RELATED HYDROCARBON POLLUTION DUE TO TRANSPORTATION,
BY SIZE OF OIL SPILL,
ALASKA - DIAPIR PLANNING AREA,
FOR PROJECTED LIFESPAN OF OCS OPERATIONS 1/

Spill Size Category	Total Volume of Spills (bbl) Over Projected Lifespan	Estimated cost of Oil Spilled Per bbl (1983 $)	Estimated Total Costs of Oil Spilled (1983 $)	Cost Per BOE Estimated in Mean Hydrocarbon Resource Estimates 4/ (1983 $)
Less than 1,000 bbls	NA	29.00	NA	NA
1,000 to 9,999 bbls	NA	29.00	NA	NA
10,000 bbls and greater	NA	29.00	NA	NA
Estimated Total bbls	NA	29.00	NA	NA

1/ Assumes 28 year lifespan.

Source: 3/84 EIS.

Table: J-3b

OCS-RELATED HYDROCARBON POLLUTION, TOTAL,
VOLUME OF OIL SPILLED, BY SIZE OF OIL SPILL,
ALASKA - DIAPIR PLANNING AREA,
FOR PROJECTED LIFESPAN OF OCS OPERATIONS 1/

Spill Size Category	Total Volume of Spills (bbl) Over Projected Lifespan	Estimated cost of Oil Spilled Per bbl (1983 $)	Estimated Total Costs of Oil Spilled (1983 $)	Cost Per BOE Estimated in Mean Hydrocarbon Resource Estimates 4/ (1983 $)
Less than 1,000 bbls	NA	29.00	NA	NA
1,000 to 9,999 bbls	22,500 2/	29.00	652,500	.00015
10,000 bbls and greater	165,000 3/	29.00	4,785,000	.00109
Estimated Total bbls	187,500	29.00	5,437,500	.00124

1/ Assumes 28 year lifespan.
2/ Estimated assuming 4.5 oil spills with average spill size of 5,000 bbls. See Source.
3/ Estimated assuming 3.3 oil spills with average spill size of 50,000 bbls. See Source.
4/ Assuming 4.38 billion B.O.E. See Source.

Source: 3/84 EIS.

HYDROCARBON POLLUTION COST EFFECTS TABLES
ALASKA - BARROW ARCH PLANNING AREA

Tables J-lb through J-3b present pertinent information on OCS-related oil spill costs resulting from production and development and transportation per B.O.E. of estimated mean hydrocarbon resource estimates for this Planning Area. Other related information, such as total volume of oil spilled, is also presented.

Table: J-lb

OCS-RELATED HYDROCARBON POLLUTION DUE TO PRODUCTION AND DEVELOPMENT,
BY SIZE OF OIL SPILL,
ALASKA - BARROW ARCH PLANNING AREA,
FOR PROJECTED LIFESPAN OF OCS OPERATIONS

Spill Size Category	Total Volume of Spills (bbl) Over Projected Lifespan	Estimated cost of Oil Spilled Per bbl (1983 $)	Estimated Total Costs of Oil Spilled (1983 $)	Cost Per BOE Estimated in Mean Hydrocarbon Resource Estimates 4/ (1983 $)
Less than 1,000 bbls	NA	29.00	NA	NA
1,000 to 9,999 bbls	NA	29.00	NA	NA
10,000 bbls and greater	NA	29.00	NA	NA
Estimated Total bbls	NA	29.00	NA	NA

Source:

Table: J-2b

OCS-RELATED HYDROCARBON POLLUTION DUE TO TRANSPORTATION,
BY SIZE OF OIL SPILL,
ALASKA - BARROW ARCH PLANNING AREA,
FOR PROJECTED LIFESPAN OF OCS OPERATIONS

Spill Size Category	Total Volume of Spills (bbl) Over Projected Lifespan	Estimated cost of Oil Spilled Per bbl (1983 $)	Estimated Total Costs of Oil Spilled (1983 $)	Cost Per BOE Estimated in 'can Hydrocarbon Resource Estimates 4/ (1983 $)
Less than 1,000 bbls	NA	29.00	NA	NA
1,000 to 9,999 bbls		29.00		
10,000 bbls and greater		29.00		
Estimated Total bbls		29.00		

Source:

Table: J-3b

OCS-RELATED HYDROCARBON POLLUTION, TOTAL,
VOLUME OF OIL SPILLED, BY SIZE OF OIL SPILL,
ALASKA - BARROW ARCH PLANNING AREA,
FOR PROJECTED LIFESPAN OF OCS OPERATIONS

Spill Size Category	Total Volume of Spills (bbl) Over Projected Lifespan	Estimated cost of Oil Spilled Per bbl (1983 $)	Estimated Total Costs of Oil Spilled (1983 $)	Cost Per BOE Estimated in Mean Hydrocarbon Resource Estimates 4/ (1983 $)
Less than 1,000 bbls	NA	29.00	NA	NA
1,000 to 9,999 bbls		29.00		
10,000 bbls and greater		29.00		
Estimated Total bbls		29.00		

Source:

HYDROCARBON POLLUTION COST EFFECTS TABLES
ALASKA - HOPE BASIN PLANNING AREA

Tables J-lb through J-3b present pertinent information on OCS-related oil spill costs resulting from production and development and transportation per B.O.E. of estimated mean hydrocarbon resource estimates for this Planning Area. Other related information, such as total volume of oil spilled, is also presented.

Table: J-lb

OCS-RELATED HYDROCARBON POLLUTION DUE TO PRODUCTION AND DEVELOPMENT,
BY SIZE OF OIL SPILL,
ALASKA - HOPE BASIN PLANNING AREA,
FOR PROJECTED LIFESPAN OF OCS OPERATIONS

Spill Size Category	Total Volume of Spills (bbl) Over Projected Lifespan	Estimated cost of Oil Spilled Per bbl (1983 $)	Estimated Total Costs of Oil Spilled (1983 $)	Cost Per BOE Estimated in Mean Hydrocarbon Resource Estimates 4/ (1983 $)
Less than 1,000 bbls	NA	29.00	NA	NA
1,000 to 9,999 bbls	NA	29.00	NA	NA
10,000 bbls and greater	NA	29.00	NA	NA
Estimated Total bbls	NA	29.00	NA	NA

Source:

Table: J-2b

OCS-RELATED HYDROCARBON POLLUTION DUE TO TRANSPORTATION,
BY SIZE OF OIL SPILL,
ALASKA - HOPE BASIN PLANNING AREA,
FOR PROJECTED LIFESPAN OF OCS OPERATIONS

Spill Size Category	Total Volume of Spills (bbl) Over Projected Lifespan	Estimated cost of Oil Spilled Per bbl (1983 $)	Estimated Total Costs of Oil Spilled (1983 $)	Cost Per BOE Estimated in Mean Hydrocarbon Resource Estimates 4/ (1983 $)
Less than 1,000 bbls	NA	29.00	NA	NA
1,000 to 9,999 bbls		29.00		
10,000 bbls and greater		29.00		
Estimated Total bbls		29.00		

Source:

Table: J-3b

OCS-RELATED HYDROCARBON POLLUTION, TOTAL,
VOLUME OF OIL SPILLED, BY SIZE OF OIL SPILL,
ALASKA - HOPE BASIN PLANNING AREA,
FOR PROJECTED LIFESPAN OF OCS OPERATIONS

Spill Size Category	Total Volume of Spills (bbl) Over Projected Lifespan	Estimated cost of Oil Spilled Per bbl (1983 $)	Estimated Total Costs of Oil Spilled (1983 $)	Cost Per BOE Estimated in Mean Hydrocarbon Resource Estimates 4/ (1983 $)
Less than 1,000 bbls	NA	29.00	NA	NA
1,000 to 9,999 bbls		29.00		
10,000 bbls and greater		29.00		
Estimated Total bbls		29.00		

Source: